ELECTRICAL WEST

November 1952
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

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Living Proof

Model homes help sell houses—no question about it. But that's not all they help sell. People who go to see them are looking for something more than shelter—they're looking for better living.

It's one thing to tell customers that "modern living" and "electric living" are practically the same thing. A better way is to *show* them. So a part of the Edison Company's advertising program takes advantage of demonstration opportunities, encourages people to see for themselves how nice modern living can be. Naturally, Edison puts major emphasis on the benefits provided by electricity and electrical appliances. Edison tells them — they see — and the dealer sells them!

SOUTHERN CALIFORNIA EDISON COMPANY

Highest quality regulation provided by 12 IRS regulators of Western Mass. Elec. Co. maintains consumer goodwill. Passing years have brought important design improvements, but even oldest units continue to provide accurate stepless regulation.

Utility Gets 21 Years of Top-notch Service From G-E Induction Voltage Regulators

Outstanding Over-all Performance. J. L. (Joe) Hyland, Supervisor of Stations, Northern Division, is thoroughly pleased with the ease of adjustment and low maintenance of IRS regulators.

Consumers get faster, closer voltage correction . . . utility reaps added benefits of reduced maintenance

J. L. (Joe) Hyland, Supervisor of Stations, Northern Division of the Western Massachusetts Electric Company, reports that the Company installed its first four G-E Type IRS single-phase induction voltage regulators at its Greenfield Substation back in 1931.

Their over-all performance and ease of adjustment so impressed company officials that they have added only G-E induction regulators at the substation since. Twelve have been installed to date—and they have been in operation almost continuously.

Protect consumer goodwill. The ability of these regulators to respond immediately to voltage changes and the resulting close regulation assure the type of service that protects valuable consumer goodwill.

They require less maintenance. Because of the rugged simplicity of the IRS design, these regulators have needed little maintenance. There are only three moving parts, which are mounted on enduring roller or ball bearings and coupled through double worm gearing. On the units built since 1940, no lubrication is necessary because the complete mechanism (including the motor) is immersed in oil.

For more information on the performance of IRS regulators, ask your G-E Apparatus Sales representative for Bulletin GEA-2985. Or write *General Electric Company, Schenectady 5, New York.* 404-94

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

NOVEMBER 1952

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-fifth year of publication

VOL. 109 NO. 5

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — John Cootz, Typography

Next Month

What is the electrical industry going to do for young engineers? That will be the subject of the lead article in the December issue.

Modernizing of the old hydro plant, using adjustable blade turbines of a type never before built, will be of special interest.

Treatment will be given, largely pictorial, to Hungry Horse, latest development of USBR.

Several new practices are to be found in the Person plant of Public Service Co. of New Mexico, including use of Q siding for the building and provision for keeping dust out from sandstorms while overhauling the main unit.

One of the manufacturers comes up with new ideas and clamps as a solution to problem of clamps and connectors.

For consulting engineers and electrical contractors the 277/480-v wiring system installed in a high school, that is reported to have saved $20 per kva in wiring cost, will be described.

Code requirements for grounding and suggested practices in industrial wiring systems will be given by a consulting engineer.

New southern California installations, the Statler Hotel and the new CBS-TV center, will be covered pictorially.

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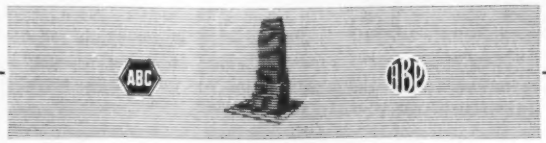

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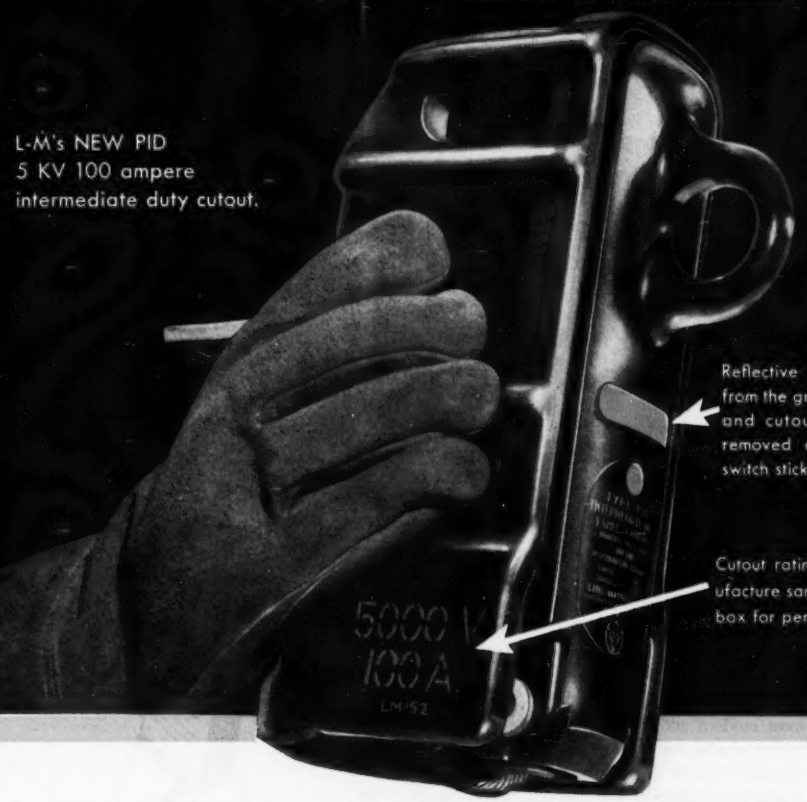

L-M's NEW PID
5 KV 100 ampere
intermediate duty cutout.
Reflective markings easily seen from the ground identify the door and cutout. Doors are easily removed and replaced with a switch stick, for safety.
Cutout rating and date of manufacture sandblasted into side of box for permanent identification.
5000 V
100 A
LM-52

L-M's New PID Cutout Provides Up To 166% Higher Interrupting Capacity At 20% Lower Cost

Costs 20% less than standard 100 ampere cutout; interrupting capacity 166% higher at 2.5 kv (8000 amperes), 66% higher at 5 kv (5000 amperes). Box will accept all standard 50 ampere doors, thus permitting one box to be used for both 50 and 100 ampere service. Also takes 200 ampere switch blade door.

L-M's PID Cutout is designed to provide a 100 ampere intermediate duty cutout at an appreciable saving over standard 100 ampere cutouts. Boxes are smaller and more compact than standard 100 ampere cutouts—they are the same size as a 50 ampere cutout but terminals and contacts are heavier. Thus the cutout will take any of L-M's 50 ampere doors, as well as the 100 ampere intermediate duty and 200 ampere switch blade door.

The non-disconnecting door provides positive link ejection and circuit interruption even on low current faults.

Both cutout and switch blade doors can be removed and replaced with standard switch sticks, providing additional safety.

Cutout and disconnect switch doors are easily identified from the ground by the reflecting markings on the doors. Rating and date of manufacture are sandblasted into sides of box for permanent identification.

Get Details on L-M Fuse Cutouts

L-M offers complete families of open and closed type cutouts to meet a wide range of requirements. Interchangeable doors offer low first cost and economical capacity increases as loads are increased. For complete information ask the L-M Field Engineer or write for bulletins. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL
fuse cutouts

103

Complete Coordinated Equipment for Distribution Today

Stab-lok's

REGISTRATION APPLIED FOR

...and best on all 5

MILLIONS OF STAB-LOK circuit breakers have been installed the country over, and Stab-lok is the *only* popular-priced breaker whose dependability has been proved under every sort of service condition. It's the one popular breaker that you can use with complete confidence.

Single pole and double pole simultaneous trip Stab-lok breakers come in a standard 15-50 amp. range. As the double pole breaker is exactly twice the width of the single pole, they are instantly interchangeable.

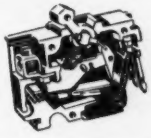
But Stab-lok is far more than a breaker. It's today's most modern and flexible circuit protection system . . . brings you an exclusive combination of advantages that assures complete dependability, amazing flexibility, and lowest installed costs. Start cashing in on Stab-lok today!

"MILLIONS-TESTED" other counts, too!

1

BIG, FULL-SIZE BREAKER

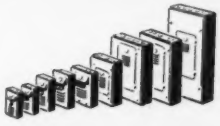
There's no paring down in size to reduce manufacturing costs. Stab-lok is a big, husky, full-size breaker. And independent laboratory tests show that Stab-lok uses twice as much metal where it counts, *carrying current* . . . that it has fewer and more rugged parts!



2

COMPLETE RANGE

The Stab-lok system gives you today's most complete range of enclosures . . . 9 basic devices and others for special applications. With 3MBA, for one example, you can convert a multibreaker into a Stab-lok, quickly and inexpensively.



3

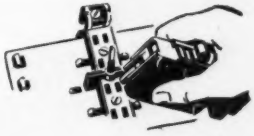
LOWEST INSTALLED COST

Records show that Stab-lok is much the easiest, most economical breaker device to install. Enclosures have lots of wiring space . . . backplate is readily removed for wire pulling . . . all components are accessible . . . special design brings quick alignment in flush mounting.

4

FOUR-WAY STABS

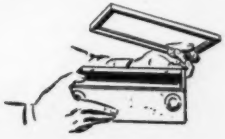
The stabs are an exclusive Federal Noark development and provide the safest and easiest method ever devised for inserting breakers. 4-way stabs make instant, positive contact with specially designed main busses and are automatically *locked* into place — no tools!



5

COMBINATION FLUSH-SURFACE ENCLOSURES

Most of the enclosures for the Stab-lok Circuit Breaker system are of the famous Federal Noark combination type for either flush or surface mounting. This virtually cuts in half the stock of enclosures necessary for meeting every sort of requirement.



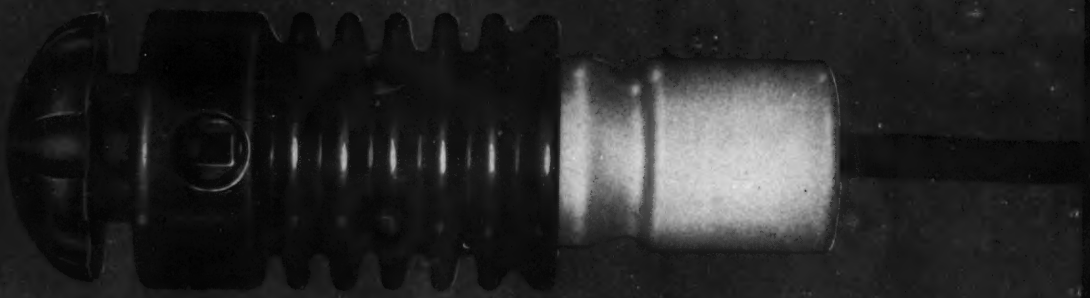
Write for Stab-lok Basic Catalog . . and order Stab-lok from your distributor today

FEDERAL ELECTRIC PRODUCTS COMPANY
50 Paris Street, Newark 5, New Jersey

FEDERAL NOARK®

Federal NOARK

THERE CAN BE NO DOUBT . . .



KUHLMAN contributed this to the electrical industry

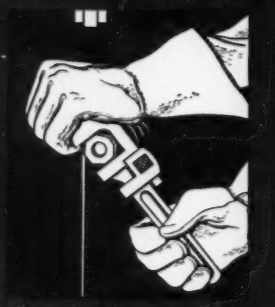
IT BEGAN IN 1939 . . . seeing the need for a safer, more convenient way of making primary line connections, Kuhlman in 1939 introduced the "Quick-Grip" bushing. It was the *first* bushing with insulated connector. For several years thereafter only Kuhlman transformers were equipped with knob-type bushings.

THIS FOLLOWED . . . gradually the user-demand for this bushing became so great that other transformer manufacturers followed Kuhlman's lead and began equipping their transformers with knob-type bushings. Today these bushings are on the way to becoming a standard feature.

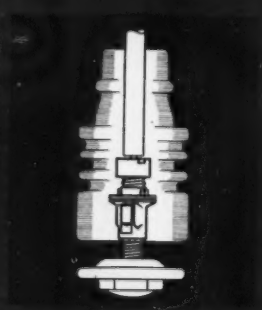
THEN, IN 1952 . . . Kuhlman improved the "Quick-Grip". The bushing is now equipped with a molded hard rubber knob instead of a porcelain knob. This means a bushing that is even safer and more convenient to use.

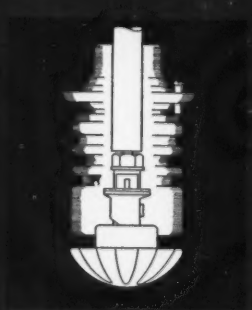
MAKE NO MISTAKE . . . the knob-type bushing is definitely a Kuhlman "first". The "Quick-Grip" with porcelain or rubber knob . . . is distinctively Kuhlman. Kuhlman not only keeps pace with but frequently leads the industry.

The evolution of the "quick-grip" bushing



This is the way connections are made with a "Quick-Grip" bushing. No tools are required as no parts are exposed. The lineman inserts the terminal, twists the knob, and the job is done.





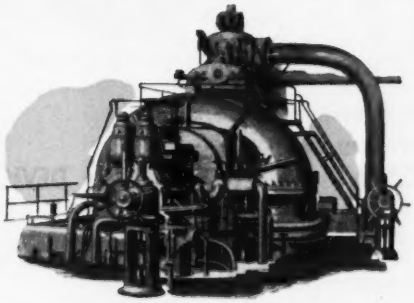
The newest "Quick-Grip" bushing has a round post instead of the hard rubber knob as the knob is formed of hard rubber. Both of these shapes for protection, workers will avoid techniques any risk of cracking a bushing.

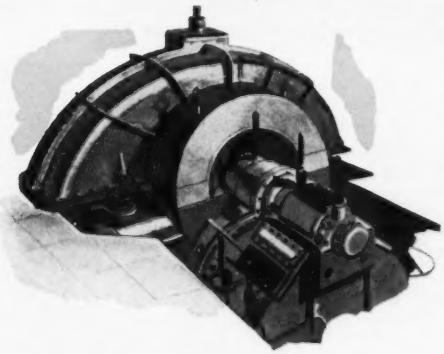
Kuhlman ELECTRIC COMPANY BAY CITY, MICHIGAN K E

TYPE "D" SAFETY ... DISTRIBUTION ... SWITCHGEAR BOARD ... SWITCHBOARD ...

TO CUT YOUR MAINTENANCE COSTS

ON TURBINES Use Shell Turbo Oil





An inhibited oil so successful in staving off oxidation and rust that it has set records for length of service ...for low upkeep costs

WHAT THIS OIL DOES

Shell Turbo Oil is a *turbine lubricating oil* from the ground up. Shell takes specially selected base stocks, fortifies them with an additive to resist oxidation, another additive to fight off rust. The result of this care is an inhibited oil that provides long, trouble-free turbine lubrication. *The original charge of Shell Turbo Oil has been in one installation since 1941!*

WHAT THAT MEANS TO YOU IN $ AND ¢

No matter what kind of turbine you operate...steam or hydro, stationary or marine, in power generation or mechanical drive...you can count on long, trouble-free lubrication with inhibited Shell Turbo Oil. And of course that means a real dollars-and-cents saving on maintenance costs. Get the full story from your Shell representative.

Remember, only Shell offers you
SHELL TURBO OIL
the oil that cuts turbine maintenance costs

HOW G-E EQUIPMENT SAVES YOU MORE ON SERIES STREET-LIGHTING SYSTEMS

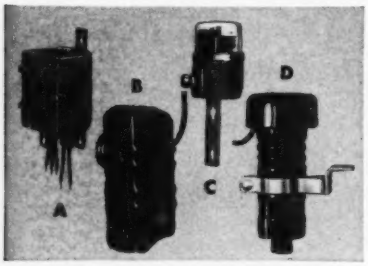
- ***Get optimum lamp performance***
- ***Save costly man hours in servicing . . .***

WITH G-E CONSTANT CURRENT TRANSFORMERS

You reduce operating expenses with G-E Constant Current Transformers because they give exceptionally fine control of secondary current from short circuit to full load . . . assuring maximum lamp life. They compensate instantly for even small changes in load or applied voltage, maintain low starting surge. They're easy to install, maintain their regulation with up to 5 degrees rake, and they're constructed for years of dependable, low-maintenance service.

Illustrated is the Type RO, normal power factor outdoor automatic current-regulating transformer; ratings 5 to 30 kw. Other G-E constant-current transformers: ROC, outdoor, high pf, 5 to 30 kw; RF, station-type, air-cooled, normal pf, 15 to 50 kw.

G-E TYPE RO TRANSFORMER



- ***Protect your circuits***
- ***Reduce operating costs . . .***

WITH G-E CONSTANT CURRENT CONTROL DEVICES

A Type J-1 Protector—provides protection from the hazards of open circuit conditions.

B Fuse Cutout—for primary fault and surge protection.

C Type P-1 Photoelectric Relay—low cost control automatically turns lighting circuits on at dusk, off at dawn.

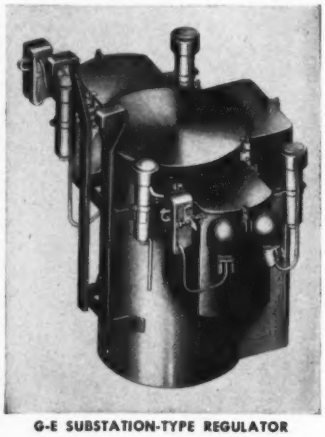
D Pellet Lightning Arrester—for protecting both primary and secondary side of transformers.

E Type E-1 Controller (not shown)—heavy-duty solenoid-operated oil switch to control transformers.

- ***Cut installation time and expense . . .***

WITH G-E "PACKAGED" REGULATORS

You reduce installation time and conserve pole space with G-E "packaged" Substation Type Constant-Current Regulators (illustrated at right). Available in 15, 20, 25, and 30 kw ratings, these "packages" contain all protective and controlling elements for efficient, economical series street-lighting operation where 120 V, 60 cycle control power is available. They are factory assembled and can be put into service simply by connecting power and control leads. Each component is readily accessible for servicing.



G-E SUBSTATION-TYPE REGULATOR

- ***Reduce planning, purchasing costs . . .***

WITH G.E.'s COMPLETE LINE OF EQUIPMENT

You can get all the equipment and devices you need for your series street-lighting systems from G.E.

Moreover, G-E lighting engineers will be glad to help you plan for your street-lighting needs. For information on any of the above equipment, or on G-E engineering service, write *Section 452-131, General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Series AJ Helipot models are only ¾" in diameter and 1¾" long; weight 1.0 oz. Ten-turn 18" slide wire gives adjustment accuracy of 1/3000 in a 100-ohm unit—1/6500 in a 50,000-ohm unit.

Helipot

Cutaway view of Model A 10-turn Helipot precision helical potentiometer. Resistance element 45" long is contained in case 2" x 1-13/16" diameter. On element are wound 3000 to 9800 turns of resistance wire, depending on total resistance value required. Adjustment accuracy is 12 to 14 times that of conventional single-turn potentiometer of equal diameter.

DRIVER-HARRIS

To win consumer preference and assure customer satisfaction, Helipot Corporation is guided by a basic policy that has proved as effective as it is simple. It is: (1) to produce components of the highest precision, and (2) to realize the economies inherent in mass production.

By following these objectives, Helipot has become the world's largest maker of precision potentiometers, producing the widest selection of single-turn and multi-turn units available anywhere.

States Helipot: "Our policy of mass producing the highest precision potentiometers practicable, in order to deliver top quality at moderate cost, is reflected in the fact that standard linearity accuracy of all our stock models, selling competitively, is held to ±0.5%. Our reliance on Driver-Harris alloys such as Nichrome V, Advance, and Karma to provide resistance windings for many of our products constitutes a strong endorsement of Driver-Harris skills and reliability."

Driver-Harris takes particular pride in having played so important a role in the Helipot story, and is fully conscious of the responsibility the confidence of this famous manufacturer imposes.

Nichrome*, Advance*, and Karma* are at your service, too; as are more than 80 other alloys developed exclusively by Driver-Harris for application in the electrical and electronic fields. We feel confident that, like Helipot, you will realize outstanding advantages by putting one or more of them to work for you. Let us have your specifications. We'll be glad to make recommendations based on your specific requirements.

*T.M. Reg. U.S. Pat. Off.

Sole producers of Nichrome, Advance, and Karma

Driver-Harris Company

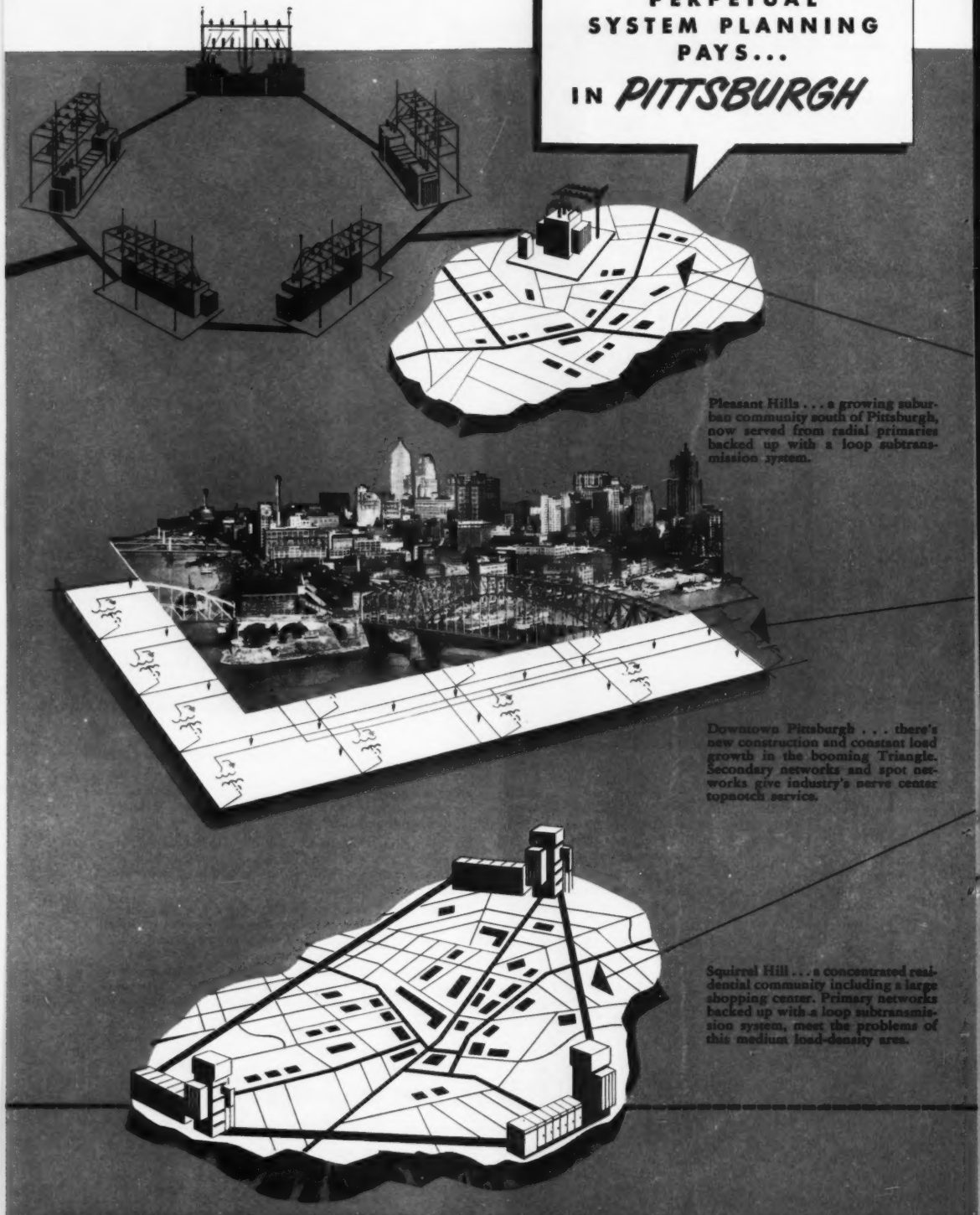
Western Representative: **ANGUS-CAMPBELL, INC.**

5320 Santa Fe Ave., Los Angeles 58 917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

PERPETUAL SYSTEM PLANNING PAYS... IN *PITTSBURGH*



Pleasant Hills . . . a growing suburban community south of Pittsburgh, now served from radial primaries backed up with a loop subtransmission system.

Downtown Pittsburgh . . . there's new construction and constant load growth in the booming Triangle. Secondary networks and spot networks give industry's nerve center topnotch service.

Squirrel Hill . . . a concentrated residential community including a large shopping center. Primary networks backed up with a loop subtransmission system, meet the problems of this medium load-density area.

"Simplified Systems

meet our load growth...
reduce distribution costs"

In Pittsburgh you'll find all the benefits from almost 30 years of sound system planning. Main benefit—complete flexibility to meet all load growth economically.

Duquesne Light Company take full advantage of the latest advances in the design and reliability of modern unitized electrical apparatus. Small blocks of power are integrated to improve their own unique Service Continuity Standards without uprooting the entire system.

CASE I Greatly increased load with subsequent voltage problems necessitated improved service continuity and the elimination of line losses for this suburban area. Proper system planning utilized a nearby subtransmission loop by installing a unit-type single-feeder substation. Pleasant Hills gets adequate service and costly field-erected substations are eliminated.

CASE II Secondary networks have provided Pittsburgh's Triangle with the highest quality of service since 1926. Badly congested primary feeders and small transformer installations were eliminated. Duquesne Light Company also offers the spot network form of the system for large commercial buildings. Sound planning enabled Pittsburgh to grow without any basic changes in the system.

CASE III 4 kv primary networks were installed in 1949 to economically meet the Service Continuity Standards for this medium load-density area. Careful planning based on load growth, income potential and geographic conditions dictated the necessity for a primary network system. Now, service continuity is high and there's complete flexibility to meet any increase or change in load density.

BECAUSE OF SOUND PLANNING, systems have been simplified, small blocks of power integrated, high service standards maintained, power distribution costs reduced. Westinghouse equipment and co-ordinated distribution apparatus have contributed to the ease and speed of changeover, dependability, and economy of this model operation. Use Westinghouse as your planning partner. Call us when you're ready to modernize. Start modern planning now!

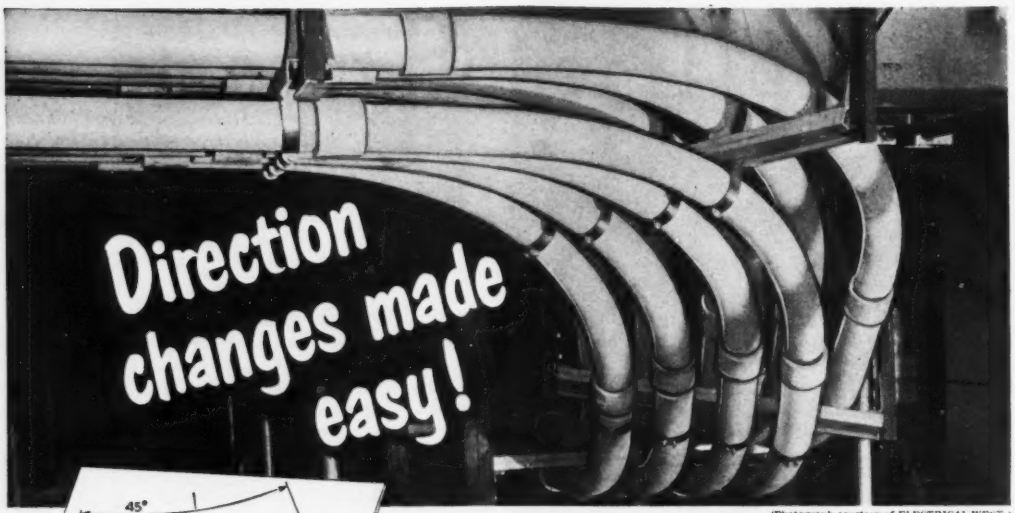
J-97154

YOU CAN BE SURE... IF IT'S Westinghouse

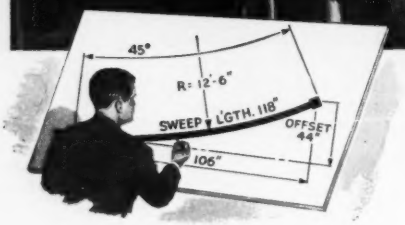
SYSTEM PLANNING SERVICE

WESTINGHOUSE

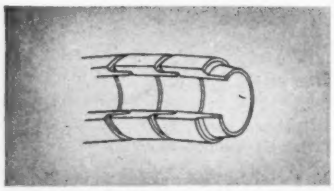
Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver



(Photograph courtesy of ELECTRICAL WEST.)



. . . with standard fittings for TRANSITE *asbestos-cement* DUCTS



5° bend segment sketched in detail. It consists of a straight section of Transite stock with a male taper on one end and a female taper on the other . . . each machined at an angle of 2½° to the center axis. Segments can thus be used single, or combined to form bend sections whose curvature is any multiple of 5°.

Photograph showing use of bend segments and curved segments with Transite Ducts.

When you use Transite Ducts, you have available a wide variety of standard fittings, made of the same asbestos-cement material as the ducts themselves. These fittings save time and expense because they provide maximum flexibility in laying out or constructing a duct system. They facilitate clearing unexpected obstructions or accommodating revisions in the original layout.

For instance, the new Transite 5° Bend Segments (shown at left) can be used alone to form simple and complex curvatures of any multiple of 5°. Used with other standard Transite curved fittings, they form curvatures of odd degrees. Thus, they enable you to simplify cross-overs and transformations . . . to clear obstructions . . . to form unusual or special bend or offset sections. They eliminate the need for purchasing special radii bends or sweeps.

The other standard Transite fittings that facilitate directional changes are the offset bends, standard 45° and 90° bends, sweeps, curved segments, laterals, tees, elbows and deflection couplings. These fittings are machined to a standard taper so that they can be used with Transite Conduit, Transite Korduct or with other Transite fittings.

For more information, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, address 199 Bay Street, Toronto 1, Ontario.

5 OTHER REASONS WHY TRANSITE DUCTS DO A BETTER JOB AT LESS COST:

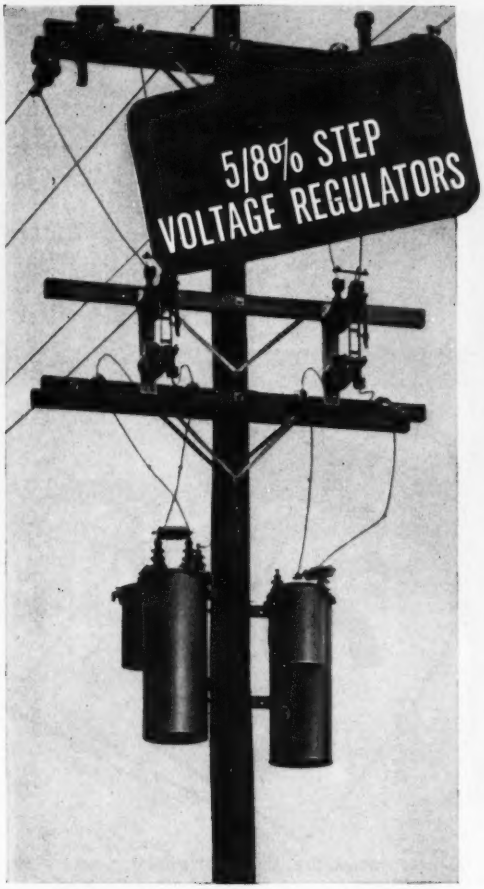
1. **Corrosion-Resistant.** Transite, being made of inorganic asbestos and cement, resists corrosion and is immune to electrolysis.
2. **Permanently Smooth Bore.** Transite makes long cable pulls easy, under any conditions. Danger of damage to cables is also minimized.
3. **Incombustible.** Transite will not burn or contribute to formation of smoke, gases, fumes. It confines burnouts, will not soften under heat.
4. **Higher Thermal Conductivity.** Cables run cooler in Transite, reducing I^2R losses, increasing current capacity and prolonging insulation life.
5. **Easy to Install.** Transite Ducts are light weight, easy to handle. Joints are quickly made. Long 10-foot lengths reduce number of joints in line.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE® DUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement



You can mount these regulators anywhere — on the ground or on a pole. Two of the three regulators for the installation shown above are on one pole; the other is on the next pole down the line.

Revenue Loss
on overloaded feeders

OVERLOADING FEEDERS at the cost of maintaining voltage is sometimes the only way you can keep up with expanding demand. It costs you revenue — and profits. You can keep revenue *up* on overloaded lines with Allis-Chalmers distribution regulators. They'll give you an accurate ± 1 volt band over a 20% operating range — plenty of room there for expansion.

Best of all, the cost is low. And installation and maintenance are easy. Simplified installation, as a matter of fact, gives you one other important advantage with Allis-Chalmers distribution regulators — they are flexible. They can be shifted from feeder to feeder easily as conditions require.

Full information is available at your nearest A-C district office. Call today or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3878

RATINGS AVAILABLE	7620 Volts—15, 50, 100 amp 5000 Volts—50, 100 amp 2500 Volts—100, 200 amp

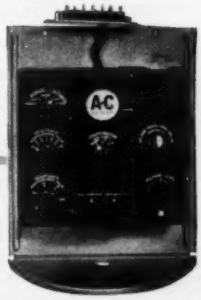
Feather-Touch Control is Friction-Free for Accuracy

Accuracy of Allis-Chalmers distribution regulator controls cannot be upset by friction because of the new regulating relay. Its design is practically friction-free. The linked dual cantilever beam bearing, which is frictionless, replaces friction-type bearings and coil springs used in other types.

LESS CLEANING AND MAINTENANCE
are required on relay contacts because they are made of platinum ruthenium. They will stand up under the type of service that causes ordinary silver contacts to become coated.

DESIGNED FOR FAST INSTALLATION
. . . there's only one adjustment to make when installing — just set the calibrated voltage level.

GET COMPLETE FACTS
on *Feather-Touch* controls. Write for Bulletin 01M7866-1.



ALLIS-CHALMERS

Originators of 5/8% Step Regulation

WHEN YOU FIGURE ELECTRICAL CABLE COSTS

DO YOU FIGURE

ALL FIVE?

All too often electrical cables are purchased solely on the basis of initial cost. Actually, of course, this is only one of five factors to consider . . . and no true cost comparison can be made until the four "hidden" costs are figured.

Here are the four "hidden" costs which often upset your overall budget, particularly when you're trying to "economize":

- **installation costs**
- **maintenance costs**
- **costs of power shutdowns when a cable fails**
- **costs of replacing a cable which has failed prematurely.**

Okonite cables are the most effective means for combating these costs. A wide range of Okonite cable designs assures you of the most economical installation for any type of operating condition. And for savings throughout the life of the cable, Okonite always uses the premium materials and exclusive processing techniques which deliver unfailing electrical service year in and year out.

We can't condense millions of man-hours of cable research, field engineering and manufacturing experience into a short description of Okonite cables. But your Okonite representative can show you in black and white why the best cables — Okonite cables — really carry the lowest overall cost. The Okonite Company, Passaic, N. J.

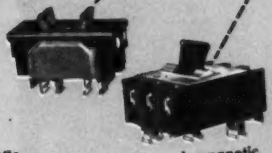
The best cable is your best policy

OKONITE SINCE 1878 ***insulated wires and cables***

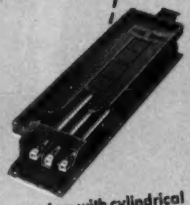
Off-the-Shelf DELIVERY!

SQUARE D "PLUG-IN" PANELETTES* FOR *LIGHTING AND POWER* SYSTEMS

• Trims and boxes separately packaged. Flush or surface type. Flush lock—directory frame—ample knockouts.



• "Plug-in" thermal-magnetic circuit breakers—individual cartons. 15 to 100 ampere ratings available.



• Interiors with cylindrical bus bars and neutral plate.

TIME SAVERS—varying job requirements can be met by using different combinations of standardized components—immediately available from Electrical Distributor stock.

MONEY SAVERS—moderate initial cost. "Plug-in" design reduces installation cost substantially.

LESS MAINTENANCE—sturdy, simplified design and construction. Positive-pressure contact jaws. Fewer bolted connections.

NMO

• "Plug-in" lighting panelettes for 2 to 40 circuits—lugs or circuit breaker mains. 15 to 50 ampere 120/240 volt A.C. circuit breaker branches.

MHP

• "Plug-in" distribution panelettes for 240 volt, 3 phase, 3 or 4 wire A.C. systems. 15 to 100 ampere breaker units, power or lighting applications.

*a PANELETTE is an Underwriters' approved panelboard, packaged in component form for flexibility in stocking and "off-the-shelf" delivery.

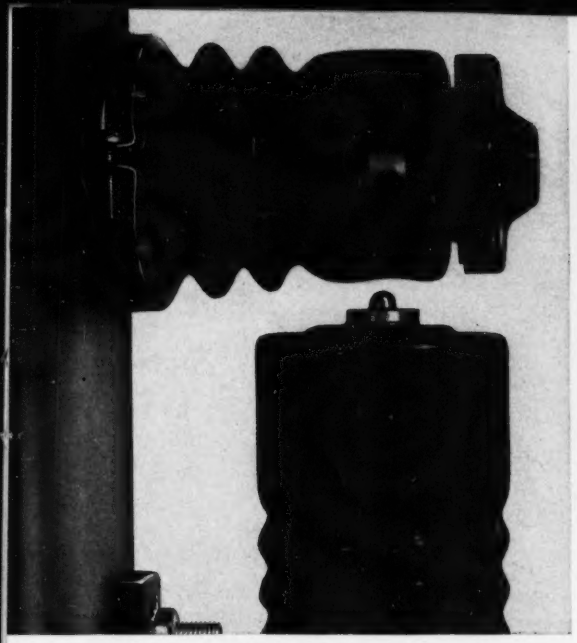
ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

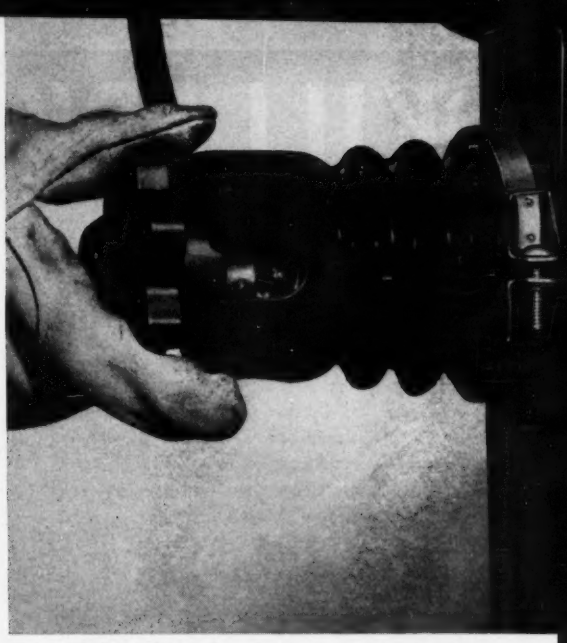
DETROIT • MILWAUKEE • LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S. A., MEXICO CITY, D.F.

UNIT TYPE
CONVENTIONAL



NEW PELLET ARRESTER on General Electric unit-type transformer is isolated from the high-voltage lead by an external gap. The gap keeps the arrester at ground potential and prevents line grounding in case of arrester damage.



NEW TANK-WALL BUSHING on both conventional and unit-type G-E transformers allows safer, faster connections from either side of the bushing—without tools. A twist of the wrist is all that's needed to clamp cable securely.

Why new G-E transformers are easier to connect, better protected

General Electric Spirakore* transformers are now easier to install. Both the conventional and the unit-type have new tank-wall high-voltage bushings which eliminate exposed live parts—permit safer, faster connections without tools. Cable can be brought in from either side of the new bushings; its insulated cap cannot drop off when unscrewed.

EXTERNAL GAP PROTECTS UNIT-TYPE

The compact design of the new unit-type G-E transformer includes a breaker, a high-voltage fuse, and a new gapped Pellet arrester. The external gap isolates the Pellet arrester from the high-voltage lead. Elimination of the positive electrical connection keeps the arrester at ground potential and prevents line grounding in the case of arrester damage.

PROTECTION THAT LASTS

Because the Pellet arrester is a valve-type arrester that has unlimited interrupting capacity, you can apply G-E unit-type transformers anywhere on your system without regard to system short-circuit current. And because a valve-type arrester is not eroded by discharge, the Pellet arrester offers protection that lasts indefinitely.

THE BEST PACKAGE YOU CAN BUY

Nitrile gaskets at every opening keep G-E Spirakore transformers moisture-proof. A one-piece cover band produces uniform gasket pressure around the entire rim, facilitating inspection and maintenance. Two baked-on paint coats provide superior resistance to weathering, water absorption, and abrasion. These features plus Spirakore design with its lower losses, greater short-circuit strength, and superior regulation, make a G-E transformer the best package you can buy.

These new G-E Spirakore transformers, both conventional and unit-type, are available in ratings 5 kv and below, 100 kva and below. For more information see your nearest Apparatus sales office, or write to Section 402-128, General Electric Co., Schenectady 5, N. Y.

**Reg. Trademark of General Electric Company*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

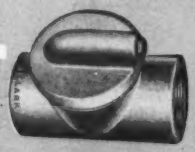
KILLARK

Alumalloy Fittings and Fixtures

some of the recent additions to the Killark line

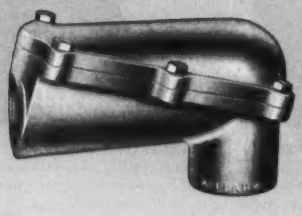
EXPLOSION-PROOF SEALING FITTINGS

Type "EYS". New size and convenient style to accommodate 2½"and 3" conduit. For vertical or horizontal runs. Threads are clean, deep and snug to insure substantial safety margin.



EXPLOSION-PROOF FITTINGS

Type "XALB". Particularly suitable where a job calls for straight pulls of heavy cables. Cover mounted with six heavy machine bolts.



VAPOR-TIGHT JUNCTION BOXES

Series "VLJD" Extra deep design (3½") suitable for mounting in concrete and where extra wiring is required.

EXPLOSION-PROOF SWITCHES

Type "XRT". Toggle type switch with new front handle lever for easy operation. Equipped with locking device lug. Available in single and double gang.

CONSTANTLY GROWING TO MEET MODERN NEEDS AND IMPROVEMENTS

- New Items
- Improved Design
- Continuous Metallurgical Research

"Killark—Always a Fitting Name to Remember"

KILLARK ELECTRIC MANUFACTURING COMPANY

Vandeventer and Easton Aves. St. Louis 13, Missouri

SALES OFFICES and WAREHOUSE STOCKS	BOSTON	156 Purchase St.	PITTSBURGH	50 26th Street	SAN FRANCISCO	140 Spear St.
	SYRACUSE	216 Burnet Ave.	CHICAGO	564 West Adams Street	LOS ANGELES	412 Seaton Street
	PHILADELPHIA	121-123 Market St.	DENVER	814 Twelfth St.	DETROIT	8319 Mack Ave.
	ATLANTA	69 Mills Street N. W.	SEATTLE	4130 First Avenue South	DALLAS	1901 Griffin Street
SALES OFFICES	COLUMBUS	2620 Welsford Road	MINNEAPOLIS	924 Andrus Bldg.	NEW YORK	30 Irving Place
	CINCINNATI	49 Central Avenue	KANSAS CITY, MO.	614 W. 26th St.	BALTIMORE	11 W. 25th St.

Connect the service leads . . . plug in the meter . . .

That's all!

The STU Heavy-Duty Socket

There's no need to devise special metering facilities for heavy current applications when you use Westinghouse Transockets. All components are in place . . . complete with secondary wiring—ready for installation . . . all in a single package! Just connect the service leads, plug in the meter . . . that's all.

The STU High-Capacity Socket lets you utilize the full inherent capacity of Westinghouse 50 ampere meters, when installed on services using #4/0 wire. It's now available for polyphase as well as for single-phase applications.

The STS Transocket combines the socket and Type MR current transformers in one compact enclosure . . . handles heavy loads up to 400 amperes.

Both units are ready to install . . . inexpensively . . . easily . . . and take standard S-Type meters.

Here's real help! The Westinghouse "Meter Socket Selector," B-5284, makes it easy for you to select the proper socket for any application. It's 20 pages, fully illustrated, covering all types of service . . . all capacities. To get your copy, write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-40426

YOU CAN BE SURE . . . IF IT'S Westinghouse

METERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

B-M *Fittings*

ARE APPROVED AS CONCRETETIGHT

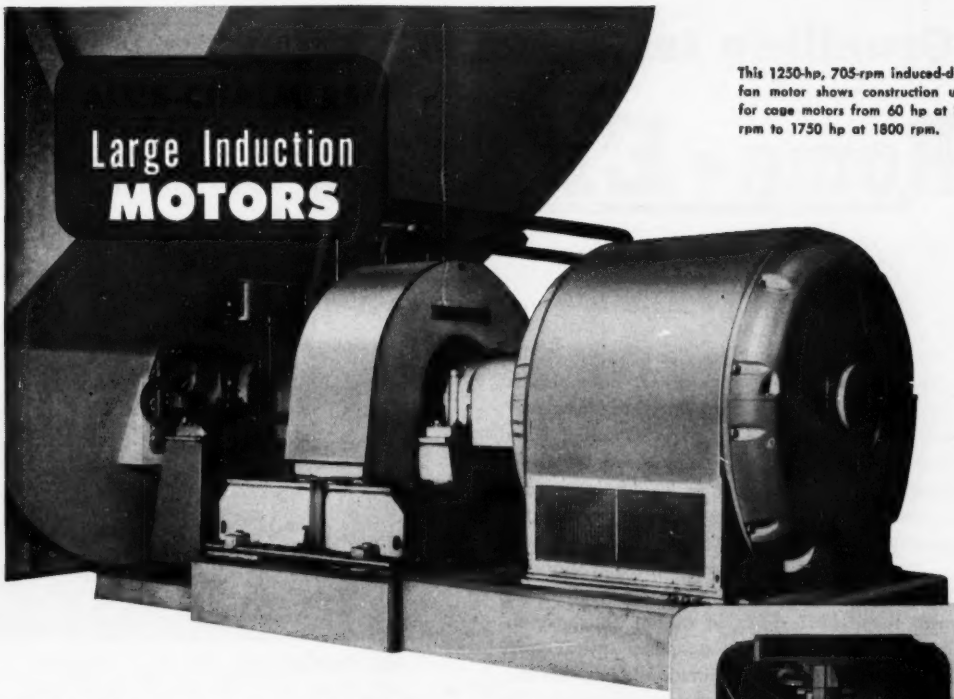
When setting E. M. T. in concrete you can make each job easier and more profitable by using Briegel All Steel Indenter Fittings that have UL approval as CONCRETE-TIGHT. Contractors the world over recognize their cost cutting qualities and the fact that they make each wiring job a better job. It is only natural that Briegel Fittings are the most widely used E. M. T. connectors and couplings.

Cross Section Showing Indentations.

BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

Distributed by

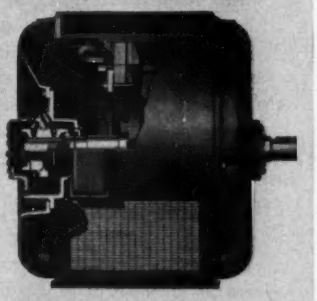
The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport, Conn.; The Steelduct Co., Youngstown, Ohio; Pittsburg Standard Conduit Co., Pittsburgh, Penn.; Wagner Malleable Products Co., Decatur, Ill.; J. R. Richards Co., Carnegie, Penn.; Kondu Mfg. Co., Ltd., Preston, Ont.



This 1250-hp, 705-rpm induced-draft fan motor shows construction used for cage motors from 60 hp at 300 rpm to 1750 hp at 1800 rpm.

GOOD TO LOOK AT... and Worth Looking Into

THIS MODERN Allis-Chalmers cage motor looks good in modern power plants—one glance at its clean, simple lines and smooth contours tells you that. But only a careful check of its design features can show how much it offers in all-around protection, easy accessibility, and operating dependability.



Cutaway view indicates construction features of this modern motor. For details, ask your A-C representative for Bulletin 0387542, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

Protection begins with drip-proof construction as standard above 500 rpm. (Splash-proofing entails no change in external appearance.) In addition, louvers on air discharges and design of intakes keep foreign objects out of the motor.

Accessibility starts paying dividends during installation; large stator air discharge openings allow ample room for drilling, doweling and bolting. And they encourage cleaning of air passages back of the stator core. For cleaning or inspecting the windings, only the upper halves of the end shields need be removed — there's no need to disturb the bearings.

Dependability stems from rigid cast-iron end shields that assure maintenance of correct bearing alignment. Capsule-type bearing housings protect the bearings and oil supply while the motor is being cleaned. And other construction details further uphold the reputation for long-life reliability enjoyed by Allis-Chalmers motors. A-3828

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Gruelling tests prove that

Rome • EMT is welded

The accompanying unretouched photographs show the results of the most punishing tests ever inflicted upon an electrical metallic tubing. Note that Rome • EMT has been compressed, flattened, flared and expanded—*yet the weld holds as firm as the metal itself* . . . further proof of the superior quality of this lightweight steel raceway.

Such "built-in" precision welding is only one of many important structural advantages you get with Rome • EMT. Light in weight and easy to bend, it assures fast, economical installation. Simple compression type fittings eliminate thread cutting and permit rapid, moisture-tight connections. A mirror-smooth interior surface makes wire pulling easy. And its electrogalvanized exterior affords utmost protection against corrosion and abrasion.

Underwriters' approved, Rome • EMT exceeds all standards for thin wall raceways. Ample stocks are now available in the following sizes:

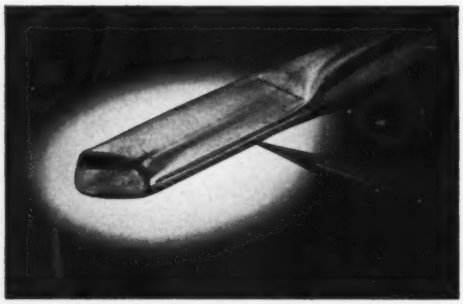
STRAIGHT LENGTHS—½", ¾", 1", 1¼", 1½" and 2".

90° ELBOWS—¾", 1", 1¼", 1½" and 2".

These Rome warehouses at your service:

Chicago, Ill.
Dallas, Texas
Denver, Colo.
Los Angeles, Calif.
San Francisco, Calif.
Seattle, Wash.
St. Paul, Minn.
Torrance, Calif.
Salt Lake City, Utah

SQUEEZED like an accordion by tons of pressure—yet the Rome • EMT weld holds firm . . . proving the weld to be as strong as the tube walls themselves.



FLATTENED like a pancake—actually creased along the weld. But look at the weld itself. It remains unbroken and as good as ever.

ROME CABLE
Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE ROME, N.Y.

It Costs Less to Buy the Best

WESTERN SALES OFFICES AND WAREHOUSES

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230 South 4th West St.

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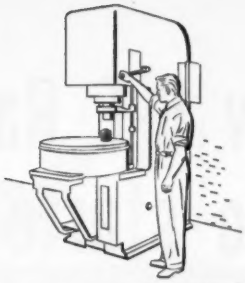
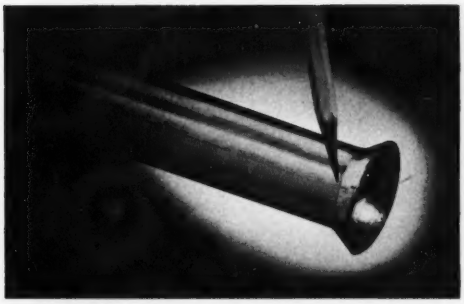
SEATTLE 4, WASH.
3404 Fourth Ave., So.

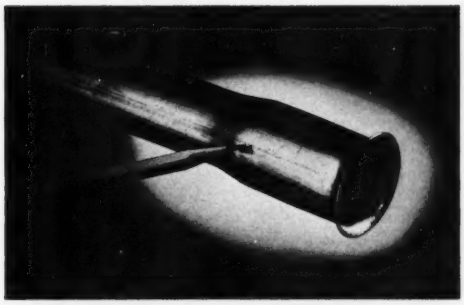
DENVER 3, COLO.
1160 Elati St.

Forever!





FLARED while cold during a cone test. And note the weld. There's not a single indication of a break.



EXPANDED 25% and flared. If weld weakness existed, this test would surely find it. Yet look at it —strong as ever . . . proof positive of Rome • EMT's superiority.

The tubing used in these tests is 1" Rome EMT .057 in wall thickness.

For unexcelled wire and cable performance:

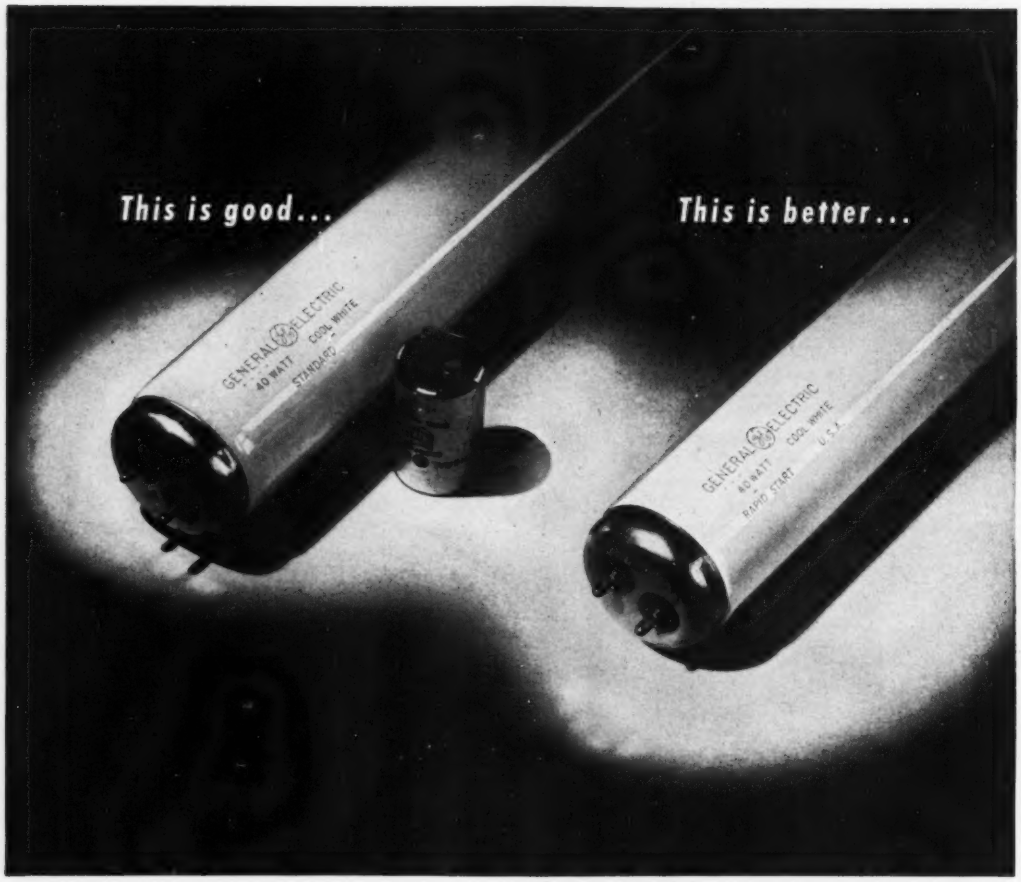
ReFlex **ReMarine** **ReBarn** **RePrene®**
ReZone® **Rome Synthinel®** **ReLene**

Test it yourself!

Get a Free Sample of Rome • EMT

Rome is anxious for you to actually see EMT—to feel its light weight, its mirror-smooth surface—to test its weld yourself . . . and compare it with any other lightweight metallic conduit on the market today. For your free sample, please write us on your company letterhead. Address Rome Cable Corporation, Rome, N. Y.

New G-E Rapid Start lamp needs no starter, cuts maintenance



IN THE NEW RAPID START lamp circuit G-E has been able to eliminate the starter required in standard lamps to pre-heat the cathode. For that reason, maintenance is even easier, more economical than before.

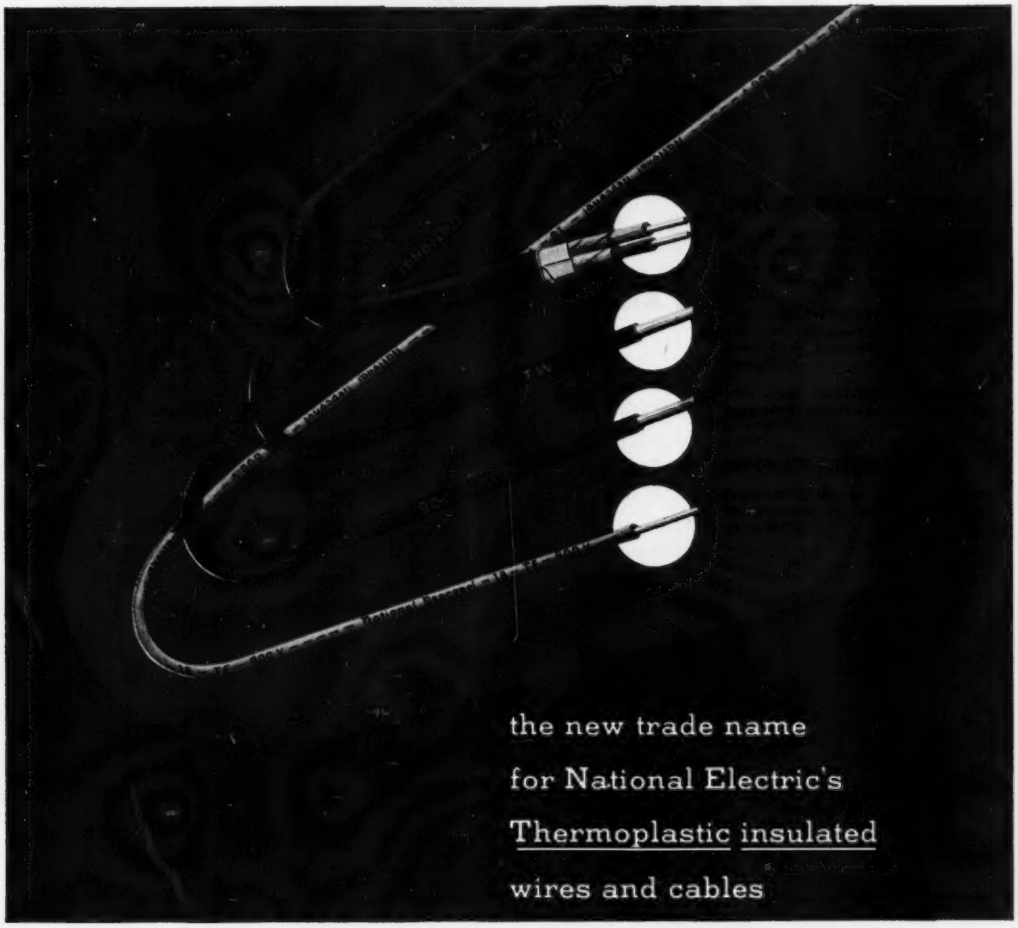
This new General Electric *Rapid Start* lamp was made possible by two G-E developments: an improved triple-coil cathode that replaces the double coil in standard fluorescent lamps, and a *Rapid Start* ballast. Together, they give General Electric *Rapid Start* lamps almost instant starting and smooth, simple operation.

G-E *Rapid Start* fluorescent lamps are rapidly becoming available. Many leading fluorescent lighting fixture manufacturers are incorporating the new lamps and ballasts in their latest equipment. These two newest developments of G-E research are another reason why you can *expect* the best value from General Electric fluorescent lamps.

You can put your confidence in—

GENERAL ELECTRIC

now it's *Nepconol*



Formerly NE'on, *Nepconol* is the new trade name for National Electric's superior building wires and cables for general use in wet or dry locations. Nepconol thermoplastic insulation *resists* moisture . . . flame . . . acids . . . alkalies . . . oil . . . abrasion. Available in a wide choice of bright, permanent colors for easy identification.

All Nepconol Building Wires are clearly marked with size, type and voltage every two feet for easy identification.

Nepconol Wires and Cables exceed Underwriters' Laboratories, Inc. requirements.

Sold through leading electrical wholesalers.

EVERYTHING IN WIRING POINTS TO

National Electric Products

PITTSBURGH, PA.

3 Plants • 7 Warehouses • 42 Sales Offices

Proof of savings!

15 years of trouble-free service follows low first costs at Brockton Edison

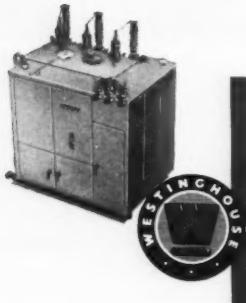
Fast-growing power requirements and rising equipment and installation costs were major utility problems in 1937, when Brockton Edison installed this 1,500-kva Westinghouse "CSP*" Power Transformer at Cohasset, Mass.*

One of the first completely self-protecting, self-contained single-feeder substations, it paid Brockton immediate dividends. It required the simplest of foundations, removed the need for costly overhead structure, eliminated field equipment co-ordination and erection problems. Now, after fifteen years of trouble-free service, Brockton reports *an absolute minimum of maintenance costs.*

Westinghouse "CSP" Power Transformers function as complete single-feeder substations. They include equipment for automatic tap changing under load, transformer, low-voltage breaker, and complete protection. All parts are factory tested, co-ordinated and assembled. Quick and easy installation, too! Delivered to you as one item, instead of sixty or more, they minimize the problems of field erection. Further economies are effected by the compact design, requiring smaller plots of land with a single foundation mat.

For complete information, contact your local Westinghouse representative, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70644

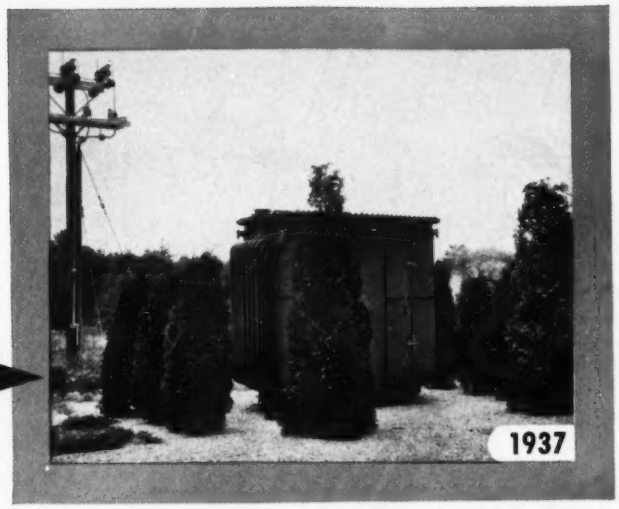
**This unit is associated with other single-circuit unit substations forming a 4.16 kv network.*



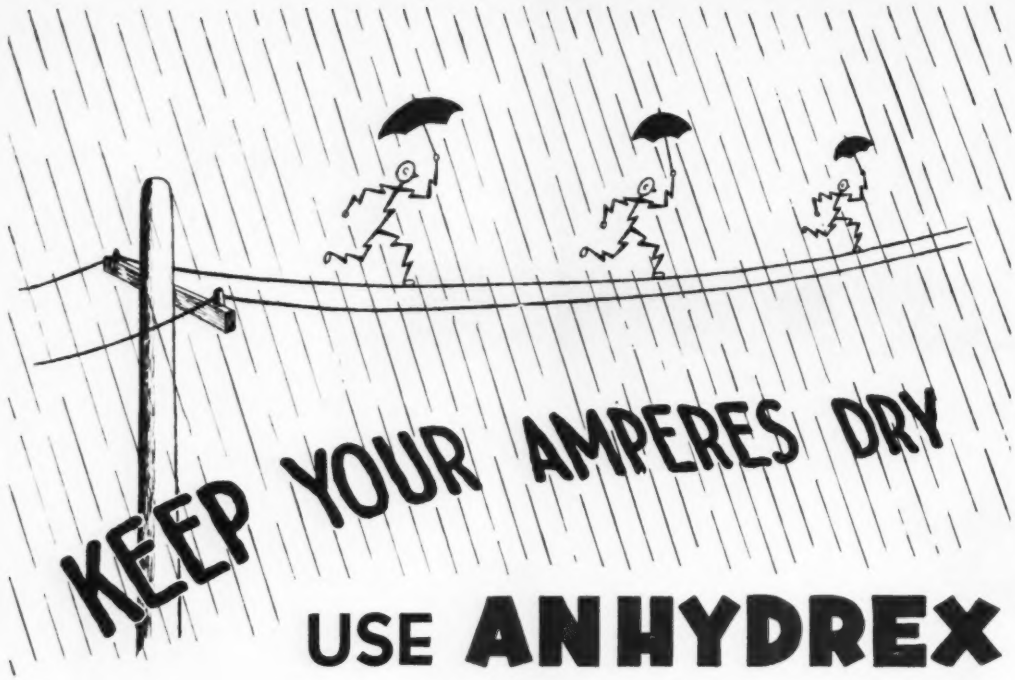
YOU CAN BE SURE ... IF IT'S Westinghouse

"CSP" POWER TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver


1937

1952



USE ANHYDREX

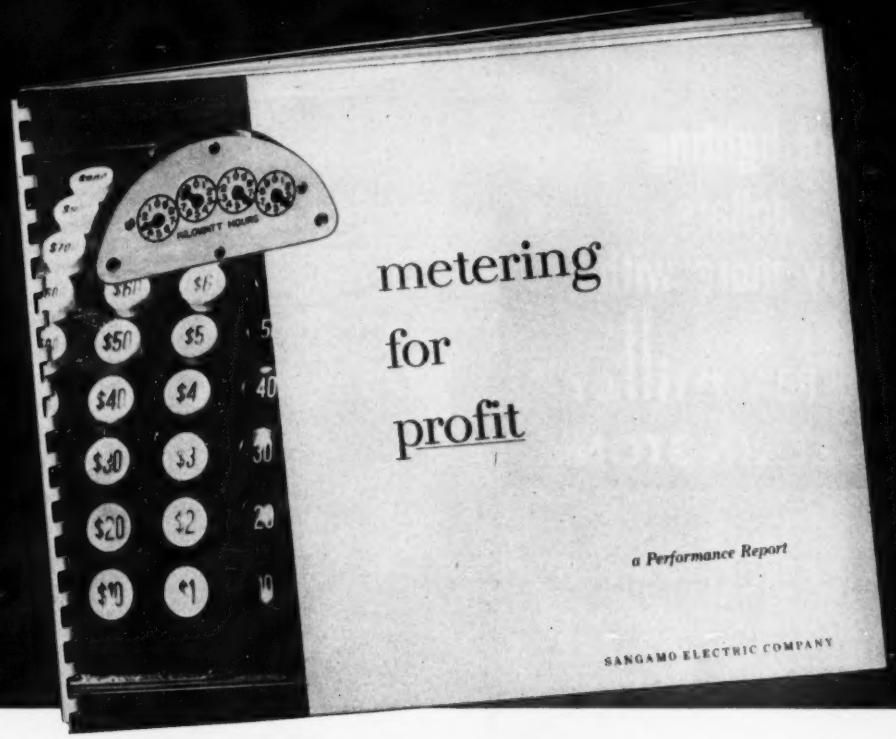
Water in some form or other causes more interference with satisfactory cable service than any other one thing. Even small amounts of moisture finding their way into cables can put important power circuits out of business.

Cables in ducts are nearly always exposed to water. Even aerial cables can suffer from water. That is why you should use ANHYDREX cables to keep your amperes dry. With Simplex Anhydrex rubber insulation you need not use a lead sheath. ANHYDREX cables will function satisfactorily even under the wettest conditions.

You can avoid cable troubles on your important network and feeder circuits by using Simplex Anhydrex insulation on your cables. In that way you assure yourself that your amperes will always be dry. If you would like to know more about this dependable, long-lived insulation, simply send a request to the address below.

SIMPLEX ANHYDREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



What would YOU like to know about metering?

Would you like to know what makes OUTDOOR METERING possible?

Sangamo J Meters are fully and precisely compensated for all temperature extremes . . . They are designed to maintain the proper physical relationships of all parts under all conditions of temperature and vibration . . . They are constructed of corrosion-resistant materials and are furnished with specially heat-treated glass covers.

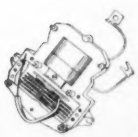
Would you like to know how HIGH BILL COMPLAINTS can be reduced?

Damping magnets control the speed of the meter. Accuracy depends on the permanence of their strength. Millions of J Meters equipped with Alnico magnets have been in operation for years without a report of a single one of them speeding up in service due to loss of damping strength.

Would you like to know what QUALITY CONTROL means to you?

Sangamo's statistical quality control insures accurate and uniform performance. Control techniques —like examining production samples . . . testing those samples . . . and checking critical dimensions assure uniform accuracy. Service records from the field are also studied and evaluated—you can read the full story in "Metering for Profit."

Would you like to know why meters can operate for years with SUSTAINED ACCURACY?



Sustained high accuracy is no accident. Liberally designed potential and current elements combine to insure accurate registration from the lightest loads to loads well over four times the nominal current rating. Other important electrical and mechanical features embody the desired characteristics in all Sangamo J Meters.

Meters are important to everybody in the Electric Utility Industry—not only because they are the operating components through which every cent of revenue is measured—but, because modern meters can help the industry obtain the maximum benefits in "Metering for Profit."

Would you like to know how modern meters can promote good public relations?

Would you like to know how accurate meters facilitate fair pricing? How dependable meters can reduce operating costs? And, how well-designed meters save operating and maintenance expense for your company?

If you are interested in the answers to these, and many other questions, get your copy of "Metering for Profit." It's yours for the asking.

SANGAMO ELECTRIC COMPANY, Springfield, Illinois

Please send my free copy of "Metering for Profit"

Your Name_____

Title_____

Company_____

City and Zone_____ **State**_____

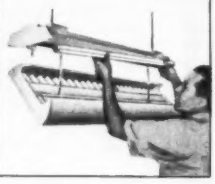
SM52-12

school-lighting dollars buy more with the new miller LEXINGTON

you get better classroom lighting at

EASY, QUICK INSTALLATION

ECONOMICAL MAINTENANCE



EXTREMELY LOW BRIGHTNESS

L.O.C.*

You get CLASSROOM LIGHTING of extremely low brightness, with high efficiency — improved lighting performance — at ***L. O. C.****

You get EASY, QUICK INSTALLATION: completely-wired 8′ channel — fewer parts to handle — fewer supports from ceiling — sliding clamp hanger grips flanged top, to simplify mounting.

You get ECONOMICAL MAINTENANCE: the LEXINGTON can be relamped 3 ways from one ladder position — (top, sides and bottom on most models)

You get LONG, USEFUL LIFE: extremely strong, rigid shielding assembly with cross baffles and side rails made from one piece of steel — steel rust-protected by 5-stage Bonderite process — hot sprayed, high baked white enamel long-life finish.

You get MORE VALUE FOR YOUR LIGHTING DOLLARS.

*Write for Miller LEXINGTON and **L. O. C.** folder. Miller field engineers and distributors are conveniently located for nation-wide service.*

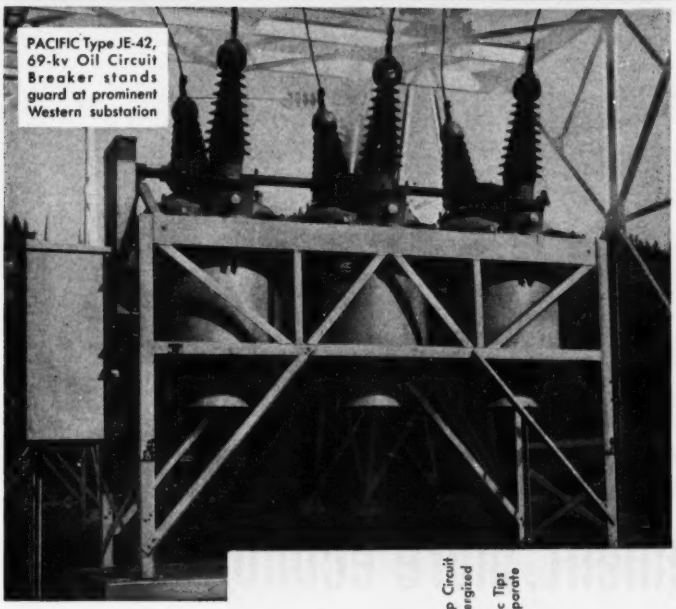
***Low Overall Cost**

THE miller COMPANY MERIDEN, CONN.
SINCE 1844

Field Sales Engineers

A. T. Bergeron, 52 Grenard Terrace, San Francisco, Calif.
E. J. Imhof, P. O. Box 832, Sherman Oaks, Calif.
C. H. McDaniel, P. O. Box 277, Menlo Park, Calif.
H. D. Lang, 6904 Grandview, Arvada, Colo.
R. C. English, 3814 N.E. Wasco St., Portland, Ore.

Advanced 69-kv Protection ...Blade-Travel Chart Shows Why



PACIFIC Type JE-42, 69-kv Oil Circuit Breaker stands guard at prominent Western substation

PACIFIC ELECTRIC

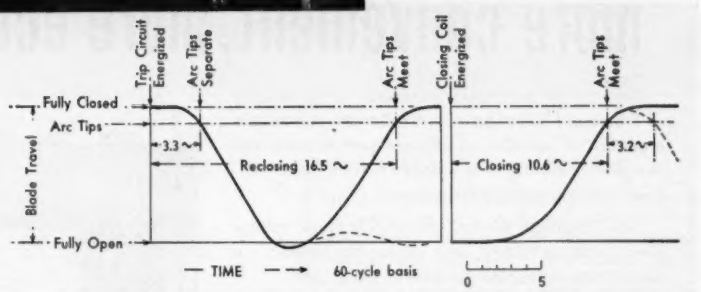
Type JE-42
Frame-Mounted

CIRCUIT BREAKERS

ELECTRICALLY and MECHANICALLY TRIP-FREE IN ANY POSITION

NEMA and ASA STANDARD

69 kv (Also other styles 7.5 to 230 kv)	Continuous	Interrupting
	600 amp	1,000,000 kva
	1200 amp	1,500,000 kva
	1200 amp	2,500,000 kva



At right: Blade-Travel Diagram (tanks filled with oil)

Open and immediate reclose shown at left of chart. Note full opening. Normal close shown at right. Dotted alternate shows start of opening after closing against fault.

THE APPLICATION Engineer needs only to glance at the blade-travel chart of the Pacific Type JE-42 to know that here is something special and out of the ordinary in 69-kv breakers.

The fast opening and reclosing holds system disturbance to a minimum in the case of both transient and permanent faults, and the fact that reclosing is from fully open position assures no impairment of insulation during the critical surge time that follows an interruption caused by repetitive lightning.

The short normal closing time as well as the reclosing time is maintained constant regardless of variation or loss of control voltage. Consequently when closing against fault there can be no slow drift-in of blades which might result in electromagnetic blow-back of blades far enough to open the a-auxiliary switch in the tripping circuit before the relays can operate. Simmering arcs are thereby avoided.

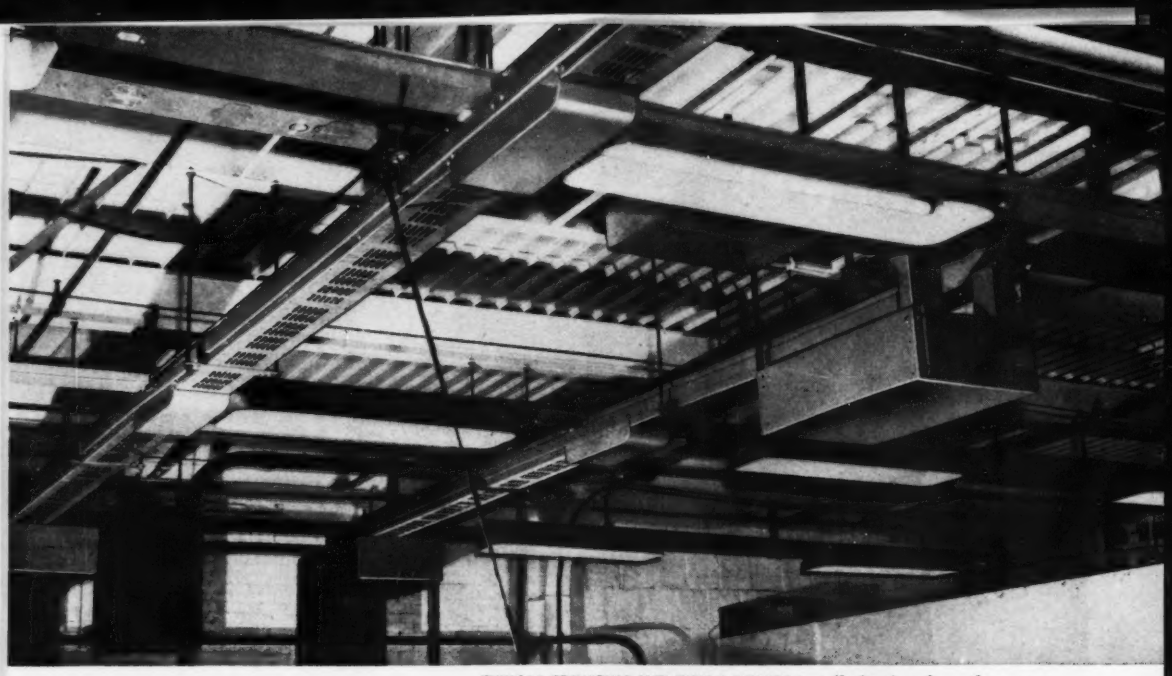
The interior construction also exhibits other advanced features that contribute to reliability of operation, as well as to ease of adjustment and low maintenance cost. Catalog 550 tells about them.

Since 1906

SALES OFFICES or AGENCIES in PRINCIPAL CITIES

PACIFIC ELECTRIC MFG. CORPORATION

5015 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA • 4500 HARRISON STREET, GARY 10, INDIANA



TYPICAL TRUMBULL LVD FLEX-A-POWER installation in a large factory.

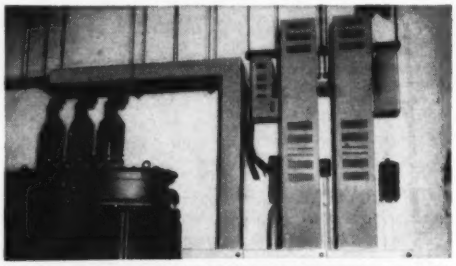
Modern power distribution made more convenient, more economical!

Industry has long taken advantage of the benefits of Trumbull LVD FLEX-A-POWER. FLEX-A-POWER's economy of installation, efficient performance and complete flexibility have aided in cutting plant overhead costs throughout the nation.

Now, Trumbull Electric offers LVD (Low Voltage Drop) FLEX-A-POWER with *aluminum* busbars — a major contribution to the busway field.

LVD now has the outstanding additional advantage of being 25 to 35% lighter in weight—making LVD FLEX-A-POWER easier to handle and cheaper to install. All joints are silver plated for positive contact and longer life. In many cases there is less voltage drop, which contributes to operating efficiency.

There is no delivery problem with aluminum LVD. Write for complete information.



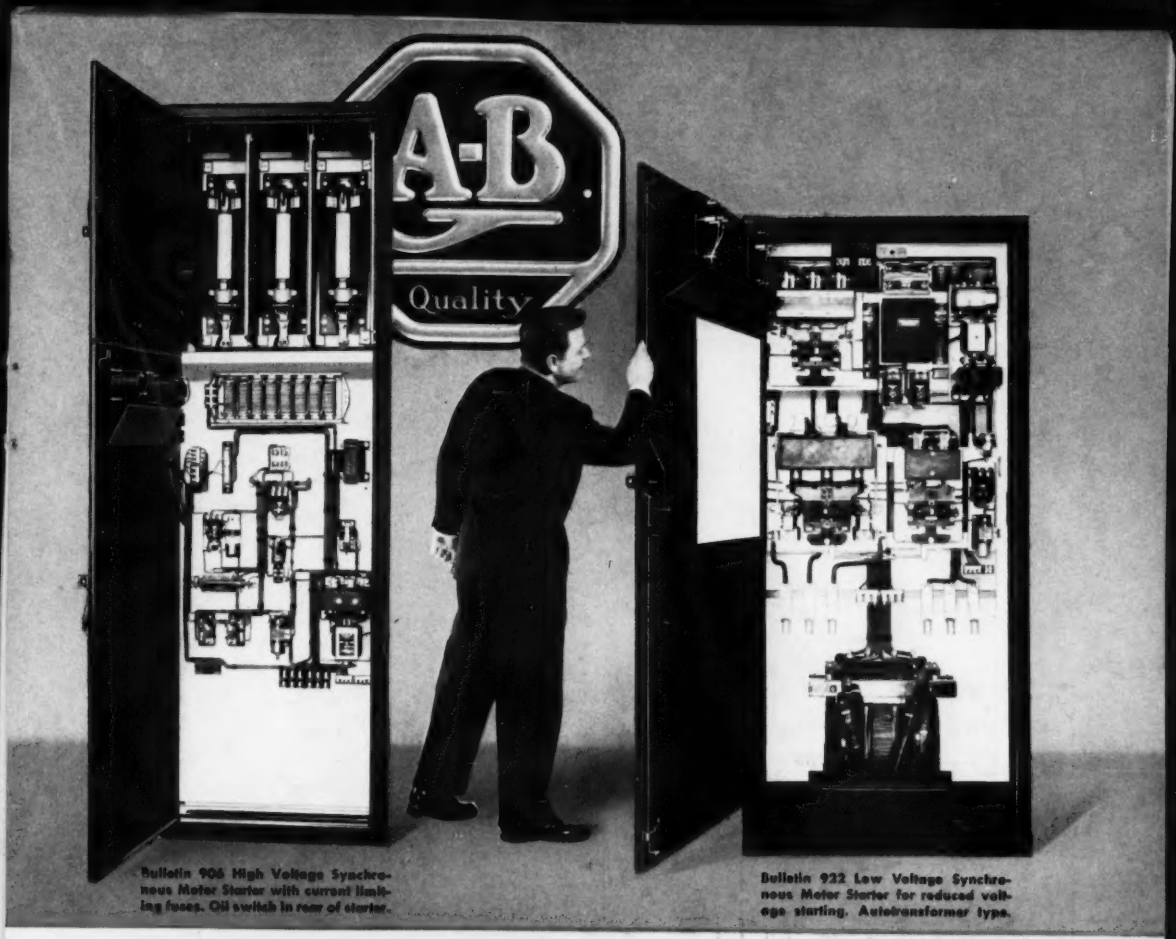
ONE OF MANY APPLICATIONS OF ALUMINUM LVD FLEX-A-POWER is as a feeder from transformer to switchboard.

The modern Trumbull LVD FLEX-A-POWER is available with current ratings of from 600 to 3000 amps, in 2, 3 or 4 pole construction, 4000 amps in 2 and 3 pole construction, and is suitable for 600 volt service.

Trumbull Assures LASTING FLEXIBILITY in Power Distribution

TRUMBULL (T) ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY
PLAINVILLE, CONN.



Bulletin 906 High Voltage Synchronous Motor Starter with current limiting fuses. Oil switch in rear of starter.

Bulletin 922 Low Voltage Synchronous Motor Starter for reduced voltage starting. Autotransformer type.

STARTERS FOR BIG MOTORS

Bulletin Number	Type of Motor	Operation	Maximum Horsepower 208-220v	440-550v	2000-2500v	2501-4600v
646	Sq. Cage	Manual	125	250	—	—
726	" "	Automatic	—	—	700	700
740	" "	"	300	600	—	—
741	" "	"	300	600	—	—
742	" "	"	300	600	—	—
746	" "	"	300	600	—	—
747	" "	"	—	—	700	700
904	Synchr.	Manual	125	250	—	—
906	"	Automatic	350*	700*	900*	900
914	"	"	250*	250*	—	—
922	"	"	350*	700*	900*	900

(*) At 100% power factor

● The motor starters, shown above, are examples of the many big units in the Allen-Bradley line.

Various types of manual or automatic starters for synchronous motors are available . . . up to 900 hp., 220 to 4600 volts.

High voltage squirrel cage automatic motor starters are listed up to 700 hp., 2000 to 4600 volts. Relays and contactors are time-tested A-B designs, fully protected when specified, by current limiting fuses.

The A-B Handy Catalog is a convenient manual on motor controls . . . large or small. Write for it, today!

Allen-Bradley Co., 1316 S. Second St.,
Milwaukee 4, Wis.

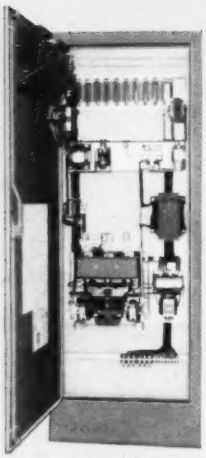
8-52—MR

A-B

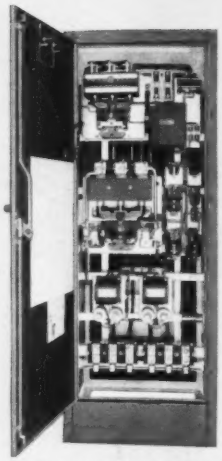
ALLEN-BRADLEY

QUALITY

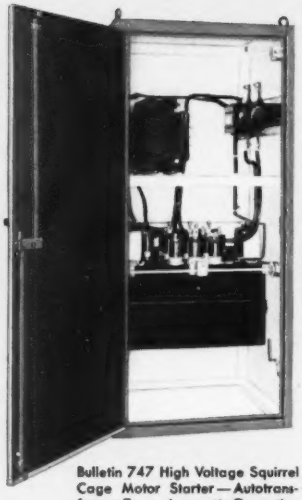
MOTOR CONTROL



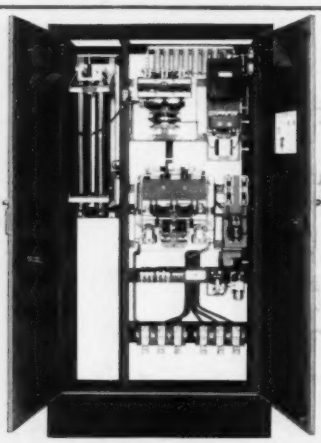
Bulletin 906 Low Voltage Synchronous Motor Starter—Full Voltage Type—Automatic Operation



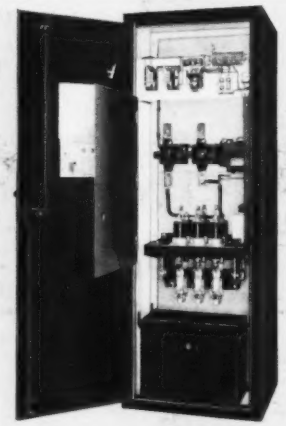
Bulletin 742 Low Voltage Squirrel Cage Motor Starter—Stepless Resistance Type—Automatic



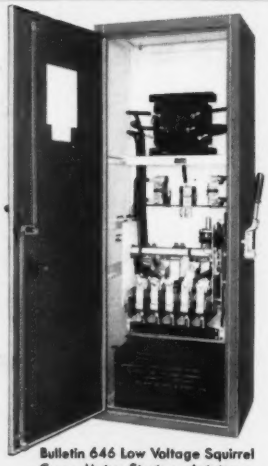
Bulletin 747 High Voltage Squirrel Cage Motor Starter—Autotransformer Type—Automatic Operation



Bulletin 914 Low Voltage Synchronous Motor Starter—Resistance Type—Automatic Operation



Bulletin 726 High Voltage Squirrel Cage Motor Starter—Full Voltage Type—Automatic Operation



Bulletin 646 Low Voltage Squirrel Cage Motor Starter—Autotransformer Type—Manual Operation

Starters for Large High and Low Voltage Motors

The high quality of design and construction, which has made the Allen-Bradley line a leader among motor starters, is built into Allen-Bradley starters for big motors, too.

These big starters can be supplied with all standard accessories, such as contactors for controlling auxiliary equipment, meters and instruments, current limiting fuses, etc. At maximum rating, these starters have an interrupting capacity of 10 times motor full load current.

Standard features of A-B synchronous starters include polarized field frequency relay, automatic resynchronization, thermal overload relays, out-of-step relay, and undervoltage protection. Reduced voltage starting is available either with resistor or autotransformer control.

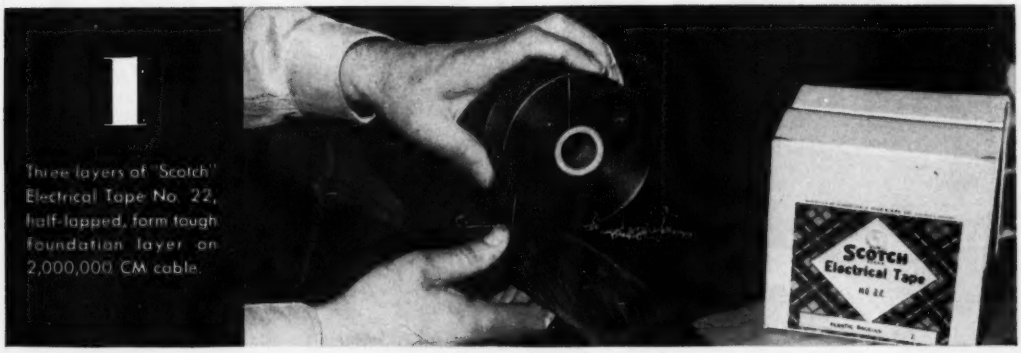
Standard features of the big A-B squirrel cage motor starters include overload relays. Current limiting fuses are recommended for all high voltage starters.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

A-B
Quality

Allen-Bradley Company
1316 S. Second Street
Milwaukee 4, Wis.

8-52—MB


1
Three layers of "Scotch" Electrical Tape No. 22, half-lapped, form tough foundation layer on 2,000,000 CM cable.
SCOTCH
Electrical Tape

TAPE takes over when insulation fails . . .

and saves huge cables from scrap heap!

WHEN HIGH OPERATING heat caused insulation failure on 2,000,000 CM cables, this large western public utility turned to tape—"Scotch" Electrical Tape—to solve the problem.

And they found just what they wanted: first, a tough, flexible tape for a first wrap; next, a glass-cloth tape with thermosetting adhesive for high heat resistance; then, an extra-heavy plastic tape to protect the cables from mechanical damage. Together, these three tapes saved the company hundreds of dollars in replacement costs.

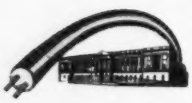
"Scotch" Electrical Tapes may be the answer to one of *your* insulating problems, too. Write today outlining your requirements. No charge or obligation, of course.

SCOTCH BRAND ELECTRICAL TAPES

3M

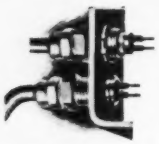
The term "Scotch" and the plaid design are registered trademarks for the more than 200 pressure-sensitive adhesive tapes made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N.Y. In Canada: London, Ont., Can.

RESISTS HEAT



OUTLASTS STRUCTURE IN WHICH INSTALLED!

Immune to age-deterioration due to its "all-mineral" construction. Unaffected by high temperatures from current overloads, either accidently imposed or to meet emergency increased power demands.



UNIT INSTALLATION!

No additional mechanical protection required. Safety M. I. Wiring is its own conduit. Available fittings permit installation in one operation using standard switch and junction boxes. Smaller diameter saves space, assures neat appearance.

NO VAPOR PASSAGE!

Completely filled with compacted mineral insulation. No need for specially installed seals in the cable run to prevent the passage of gases through the wiring system. Safety M. I. Wiring is completely impervious.

COMPLETELY MOISTURE-PROOF!

Simple fittings are available to permanently seal both ends of each run of Safety M. I. Wiring. No possible entrance for moisture. Normal concern over this hazard is, thereby completely eliminated.

RIGID YET FLEXIBLE!

Thumb pressure bending, in ordinary sizes, easily fashions orderly wall patterns—conforms wiring to any contour. Once formed, and fastened with standard clamps or straps, Safety M. I. Wiring stays put.

*Exclusively A General Cable Product

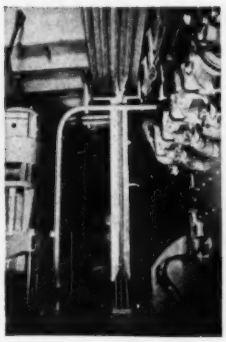
SAFETY m.i. WIRING*

is completely non-combustible. Will neither burn, support combustion nor convey flame.

On board ship, in hospitals, in museums, in art galleries, in chemical plants or in any structure, Safety m.i. Wiring will be received with earnest enthusiasm.

For Safety m.i. Wiring—a new General Cable product—permits operation of the wiring system, even "Under Fire!" The mineral insulation of Safety m.i. Wiring is completely non-combustible! It cannot generate toxic, combustible, or explosive gases. And—there is no service interruption if fires expose the cable to temperatures approaching the melting point of the copper sheath.

The further important advantages of this new General Cable product, as explained below, should warrant your immediate attention, especially if you require the ultimate in quality, service-reliability and permanence of your contemplated wiring of circuits up to 600 volts. Write today for the informative booklet titled, "20 Questions and 20 Answers About Safety m.i. Wiring."



Shown at left is the Safety m.i. installation at the Louvre, in Paris. Placed within the mortar seams of the stone walls, it has created a 100% fire-safe wiring system. Illustrated on the right is the typical usage of Safety m.i. Wiring in the engine room spaces on board a ship.

"More Power to You" ®

GENERAL CABLE

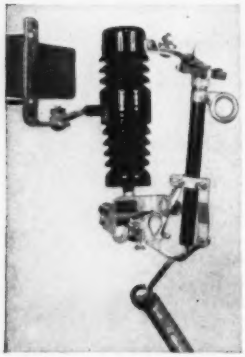
CORPORATION

EXECUTIVE OFFICES: 420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

Sales Offices in Principal Cities of the United States

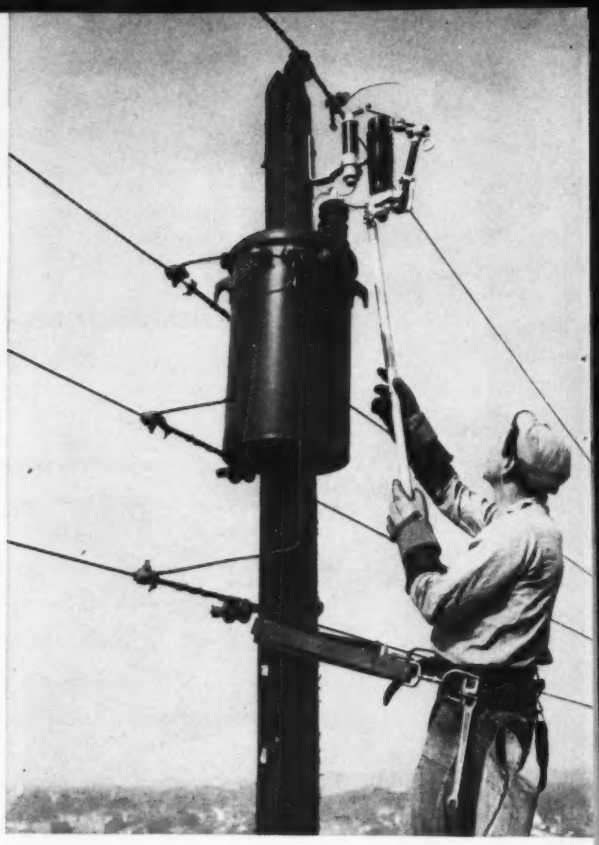
1 Fuseholder assembly showing how fuse-link cable passes over lever arm of load-break device.

2 Downward pull on switchstick inserted in hook-eye breaks fusible element of fuse link.



3 When fuse link breaks, the cutout interrupts load current as it would interrupt a low fault current.

4 After current interruption, fuseholder drops open removing itself from the circuit.



New G-E Load-break Cutout provides easy low-cost load switching . . . sectionalizing

Liberal design of G-E cutouts permits simple load-break device

General Electric's Open Dropout Fuse Cutouts—7.8 kv and 15 kv, 100-ampere ratings—now feature an optional load-break device. With it, you can switch loads or sectionalize your distribution circuits with but little increase in your cutout investment.

Fast, safer switching. The new load-break device operates by breaking the fusible element of the fuse link *with arc-interruption occurring inside the fuseholder tube.* It provides fast, safer switching of either inductive or capacitive load currents up to the 100-ampere continuous rating of the cutout. By substituting load-break fuseholders for conventional fuseholders—both 2000-ampere and 5000-ampere ratings—cutouts already in service are converted to load-break operation.

Liberal design of G-E cutouts for full-range current interruption makes them ideal for breaking load currents. It also permits an extremely simple load-break device that consists only of a stainless steel lever arm coupled to the cutout fuseholder. The load-break device has no awkward protrusions or parts to stick, bind or otherwise interfere with the dropout action of the cutout. And it does not interfere with fusing or inserting and removing the fuseholder by switchstick.

For more information on this, and other cutouts, write to *General Electric Company, Schenectady 5, New York.*

406-45

G-E OPEN DROPOUT FUSE CUTOUTS OFFER YOU MANY UNIQUE "EXTRAS"

- "Birdproof construction" eliminates unnecessary fuse blowing.
- Close coupling of fuseholder to insulator, plus shock absorbers, reduces recoil stresses.
- Sealed upper end on fuseholder excludes water and controls expulsion gases.
- "Hinge guides" eliminate side-sway, provide positive contact engagement.
- Interchangeable standard and heavy-duty fuseholders — 2000-amp. and 5000-amp. interrupting ratings.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Nicopress

The Tool and the Sleeve

that are made to work together

together they make the perfect splice

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

LET'S BRING IT OUT IN THE OPEN...

The BIG QUESTION is "Are Preformed Armor Rods the most efficient and economical answer for conductors 4/0 and larger?" Practically every Utility Engineer and Contractor recognizes the merits of Preformed Armor Rods for the smaller conductors, but in some minds, there has been a question or two regarding their application on the larger ones.

However, for British Columbia Electric Company Limited (see opposite page), there is no question. They are using Preformed Armor Rods on their new 795,000-cir mil ACSR conductors. And one Utility after another in this Country is adopting them because of their exclusive and outstanding advantages. Below are listed some Users of "large-size" Preformed Armor Rods.

For details on your specific application, write or telephone Cleveland: EXpress 1-3571.

USER	SIZE ACSR CONDUCTOR	USER	SIZE ACSR CONDUCTOR
Boston Edison Co.	795,000 Cir Mils	New England Power Co.	795,000 Cir Mils
California Electric Power Co.	4/0	New Jersey Power & Light Co.	556,500 Cir Mils
California Oregon Power Co.	795,000 Cir Mils	New York State Elec. & Gas Corp.	636,000 Cir Mils
California-Pacific Utilities Co.	4/0	Niagara Mohawk Power Corp.	336,400 Cir Mils
Central Maine Power Co.	266,800 Cir Mils	Northern States Power Co.	336,400 Cir Mils
Central Power & Light Co.	4/0	Ohio Edison Co.	795,000 Cir Mils
Cincinnati Gas & Electric Co.	4/0	Ohio Power Co.	477,000 Cir Mils
Cleveland Electric Illuminating Co.	795,000 Cir Mils	Oklahoma Gas & Electric Co.	477,000 Cir Mils
Consumers Power Co.	266,800 Cir Mils	Otter Tail Power Co.	266,800 Cir Mils
Detroit Edison Co.	795,000 Cir Mils	Pacific Power & Light	397,500 Cir Mils
Georgia Power Co.	4/0	Pennsylvania Electric Co.	1,033,500 Cir Mils
Gulf States Utilities Co.	336,400 Cir Mils	Portland General Electric Co.	795,000 Cir Mils
Idaho Power Co.	397,500 Cir Mils	Potomac Edison Co.	556,500 Cir Mils
Illinois Northern Utilities Co.	477,000 Cir Mils	Public Service Co. of Indiana, Inc.	477,000 Cir Mils
Indiana & Michigan Electric Co.	556,500 Cir Mils	Rochester Gas & Electric Co.	336,400 Cir Mils
Indianapolis Power & Light Co.	954,000 Cir Mils	St. Joseph Light & Power Co.	4/0
Iowa Power & Light Co.	4/0	Sacramento Municipal Utility Dist.	4/0
Kansas City Power & Light Co.	556,500 Cir Mils	San Antonio Public Service Board	336,400 Cir Mils
Kansas Gas & Electric Co.	477,000 Cir Mils	Sierra Pacific Power Co.	4/0
Kansas Power & Light Co.	266,800 Cir Mils	Southwestern Public Service Co.	397,500 Cir Mils
Los Angeles Dept. of Water & Power	954,000 Cir Mils	Tennessee Valley Authority	397,500 Cir Mils
Louisville Gas & Electric Co.	795,000 Cir Mils	Union Electric Co. of Missouri	795,000 Cir Mils
Lowell Electric Light Corp.	795,000 Cir Mils	Utah Power & Light Co.	397,500 Cir Mils
Metropolitan Edison Co.	556,500 Cir Mils	Virginia Electric & Power Co.	477,000 Cir Mils
Minnesota Power & Light Co.	4/0	Washington Water Power Co.	795,000 Cir Mils
Mississippi Power & Light Co.	4/0	West Penn Power Co.	556,500 Cir Mils
Missouri Public Service Corp.	4/0	Western Light & Tel. Co.	266,800 Cir Mils
Monongehela Power Co.	556,500 Cir Mils	Western Massachusetts Elec. Co.	336,400 Cir Mils
Montana Power Co.	336,400 Cir Mils	Wisconsin Public Service Corp.	266,800 Cir Mils

British Columbia Electric Company Limited, in pioneering their 345-kv transmission line, has most modern installation in the Western Hemisphere. PREFORMED ARMOR RODS will protect the initial single conductor at the support points as well as the dual conductors, illustrated above, which are planned for ultimate installation.

Shown in the picture are, left to right: J. P. Fraser, assistant chief engineer, electrical division; F. O. Wollaston, superintendent of design, engineering division; T. Ingledow, vice-president and chief engineer; J. H. Steede, executive assistant to vice-president and chief engineer; H. W. Smith, assistant chief engineer, engineering division.

PREFORMED LINE PRODUCTS COMPANY
5349 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

YOU GET 4 EXCLUSIVE ADVANTAGES WHEN YOU SPECIFY

FLEUR·O·LIER

1 Only Fleur-O-Lier fixtures are rated on the Fleur-O-Lier Index Rating System. This gives illuminating characteristics, shielding, brightness, etc., for each fixture.

2 Complete photometric test data including distribution curves and coefficients of utilization tables are computed by Electrical Testing Laboratories, Inc., and are provided for every Fleur-O-Lier luminaire.

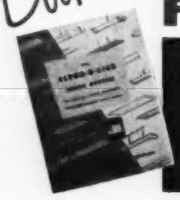
3 Fleur-O-Lier fixtures are *certified* by Electrical Testing Laboratories, Inc., as complying with rigid specifications covering electrical and mechanical construction.

4 More than 300 different Fleur-O-Lier fixtures made by nearly 30 manufacturers give you a wide selection from which to choose.

THESE 4 ADVANTAGES ASSURE *Lighting Satisfaction* WHEN YOU SPECIFY FLEUR-O-LIER

Free Booklet

Write for your free copy of the new booklet giving complete details of the Fleur-O-Lier Index System.



FLEUR·O·LIER

Manufacturers

2116 Keith Building • Cleveland 15, Ohio

Fleur-O-Lier is not the name of an individual manufacturer but of a group of fixtures made by leading manufacturers. Participation in the Fleur-O-Lier program is open to any manufacturer who complies with Fleur-O-Lier requirements.

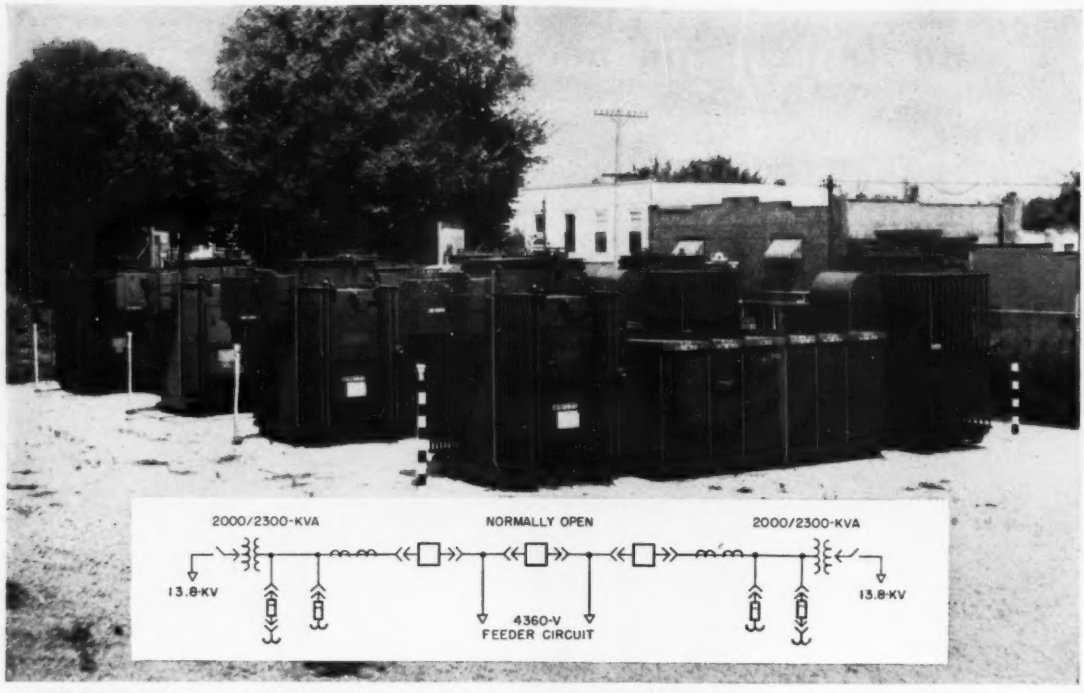
no description needed...

those who use **General** *switches know WHY— they are without equal!*

General
Switch Corp.
49 Roebling Street Brooklyn 11, N. Y.

WRITE FOR CATALOG #5201

ENCLOSED SAFETY SWITCHES · BRANCH CIRCUIT PANELS · SERVICE ENTRANCE EQUIPMENT



"BLOCK BUILDING" in Kansas City. Substation 45 points up "building block" method. Two G-E 4000/4600-kva master unit substations were installed in 1947, two more in 1949. One-line diagram (inset) shows type of standardized duplex station used.

Missouri utility plans ahead for expansion using standardized G-E unit substations

Kansas City Power & Light gains system flexibility with "building block" approach

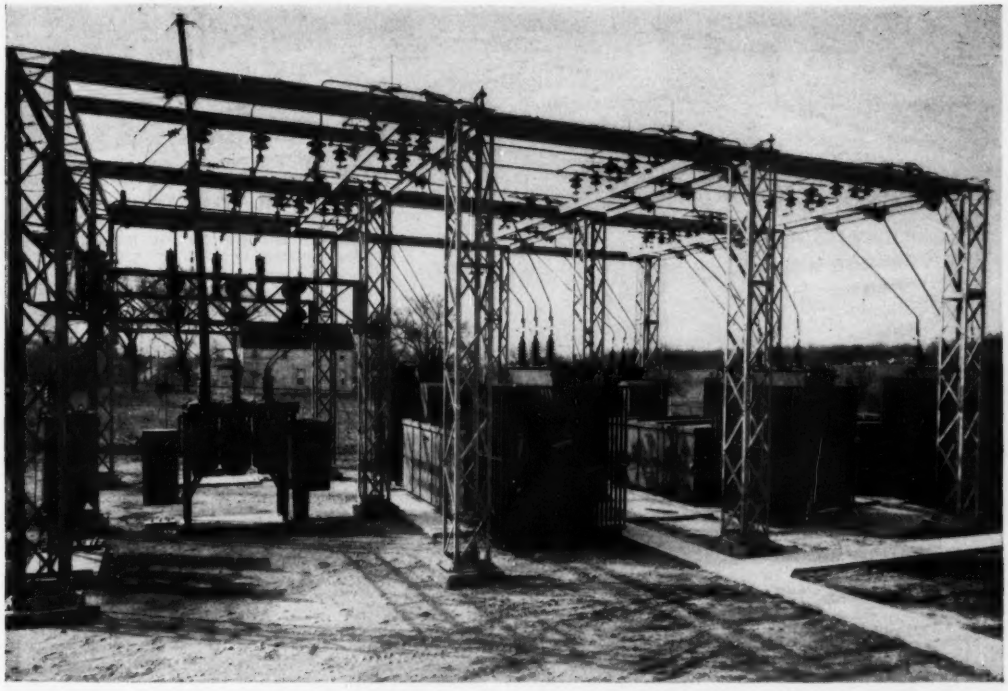
With 22 G-E standardized master unit substations installed over a five-year period, Kansas City Power & Light Co., Kansas City, Mo., knows the value of advanced planning—using duplicate units as "building blocks" in its system.

This "building block" method—which permits adding or removing capacity in easily handled, relatively small "blocks of power"—has enabled the Missouri utility to expand its system simply and economically. Engineers early decided upon the unit substation which best suited their purposes—in this instance, a G-E 4600-kva duplex unit.

In addition, utility engineers have achieved maximum flexibility to take care of unexpected load growth. They can meet load shifts simply by shifting the standardized G-E units. If the load should change radically, they can move quickly to other types of standardized G-E unit substations, still employing the "building block" approach.

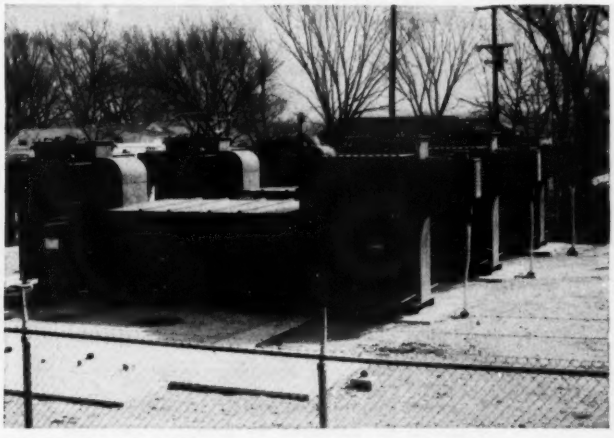
Your needs most likely parallel those of the Kansas City utility, and you, too, will find that advanced planning with the "building block" method keeps system investment as low as possible in relation to actual load. Small "blocks of power," with their flexibility and economy, give insurance against excessive investment in unused capacity.

At the same time, G-E factory-assembled master unit substations simplify planning and purchasing—save time in delivery and installation. And with G-E equipment, you are assured of dependable, first-quality components made possible by repetitive manufacturing methods. For full information, write for Bulletins GEA-3800 and GEA-4500. *General Electric Company, Schenectady 5, New York.* 323-100



STANDARDIZED SUBSTATION. Supplied complete by General Electric, 3 units and steel structure of Substation 30 were delivered ready for immediate installation. Factory-engineered substations simplify purchasing, save valuable engineering time.

CONCEALED BY TREES. This one-unit substation in residential area shows how proper planting can effectively camouflage installations.



READY FOR NEXT UNIT. Kansas City's Substation 84 has three duplex units already installed. Foundation, in foreground, is set for fourth unit, if required for increased load.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

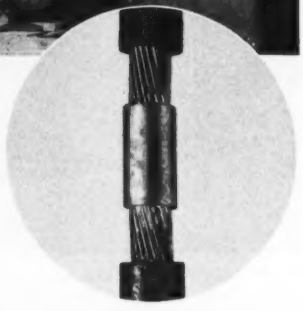
Always the best connections at the STATLER

In building a new hotel as in customer service by their employees, STATLER Hotels demand the best. That is why CADWELD was selected to make electrical connections at the new Statler Center in Los Angeles. Illustrated are junction box connections of 500 MCM Cable permanently welded by the CADWELD PROCESS in the vertical position.

For the best in electrical connections — use CADWELD.

The CADWELD ELECTRICAL CONNECTION:

- **cannot loosen or corrode**
- **cannot be damaged by excessive overload**
- **has a current carrying capacity equal to that of the cable.**

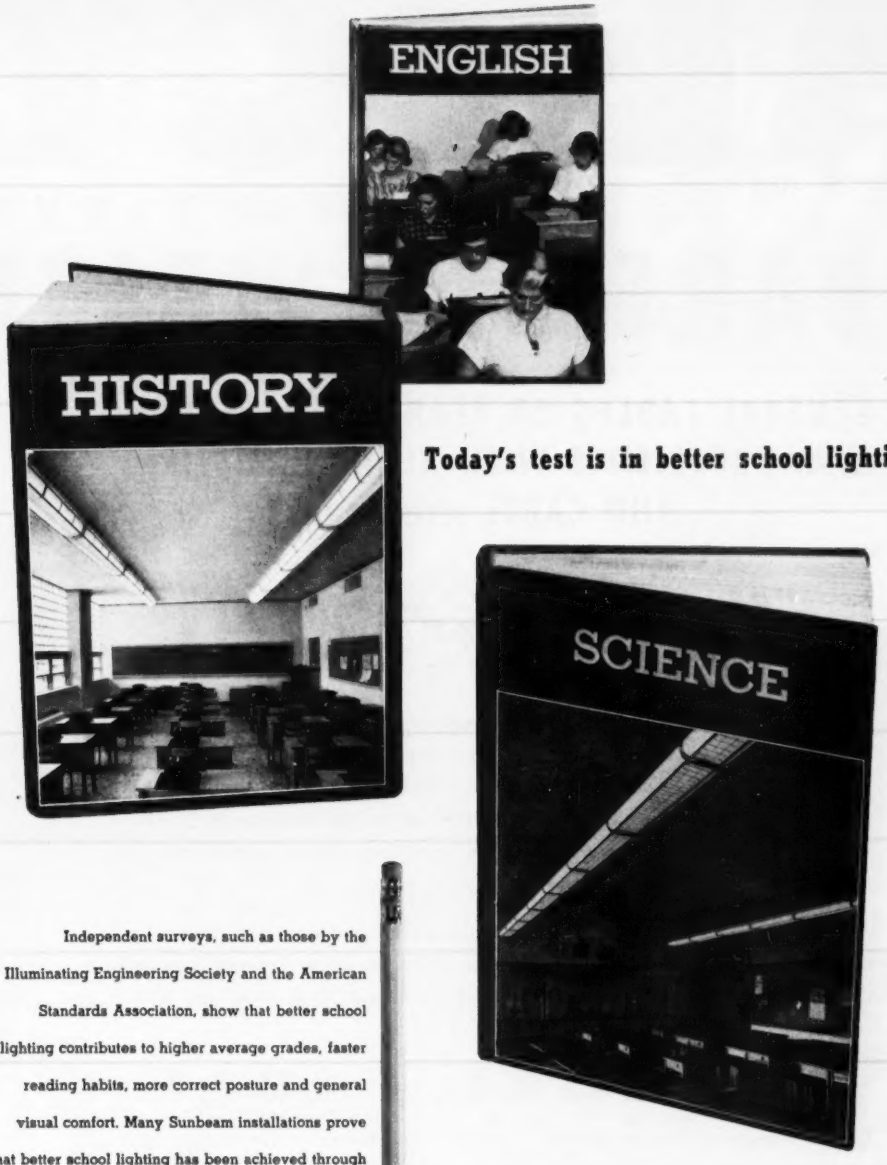


CADWELD ELECTRICAL CONNECTIONS are made on #6 wire through 3000 MCM Cable.

Electrical Connection Catalog on request.

ERICO PRODUCTS, INC.

2070 EAST 61 PLACE CLEVELAND 3, OHIO



Today's test is in better school lighting

Independent surveys, such as those by the Illuminating Engineering Society and the American Standards Association, show that better school lighting contributes to higher average grades, faster reading habits, more correct posture and general visual comfort. Many Sunbeam installations prove that better school lighting has been achieved through the coordinated efforts of architects and our illuminating engineers. Typical installations are at Tucson, Ariz. (above) with #1210-96 units and at Houston, Tex. with #1500-96. See our catalog of school fixtures in the 1952-53 edition of "The American School and University."

SUNBEAM visionaire LIGHTING DESIGN CENTER

SUNBEAM LIGHTING COMPANY

777 EAST 14TH PLACE • LOS ANGELES 21, CALIF.

ALECTI

(ALUMINUM)

BARE and WEATHE

GENERAL CABLE'S 20 YEARS OF RESEARCH AND EXPERIENCE WITH ALUMINUM WIRE AND CABLE *means...*

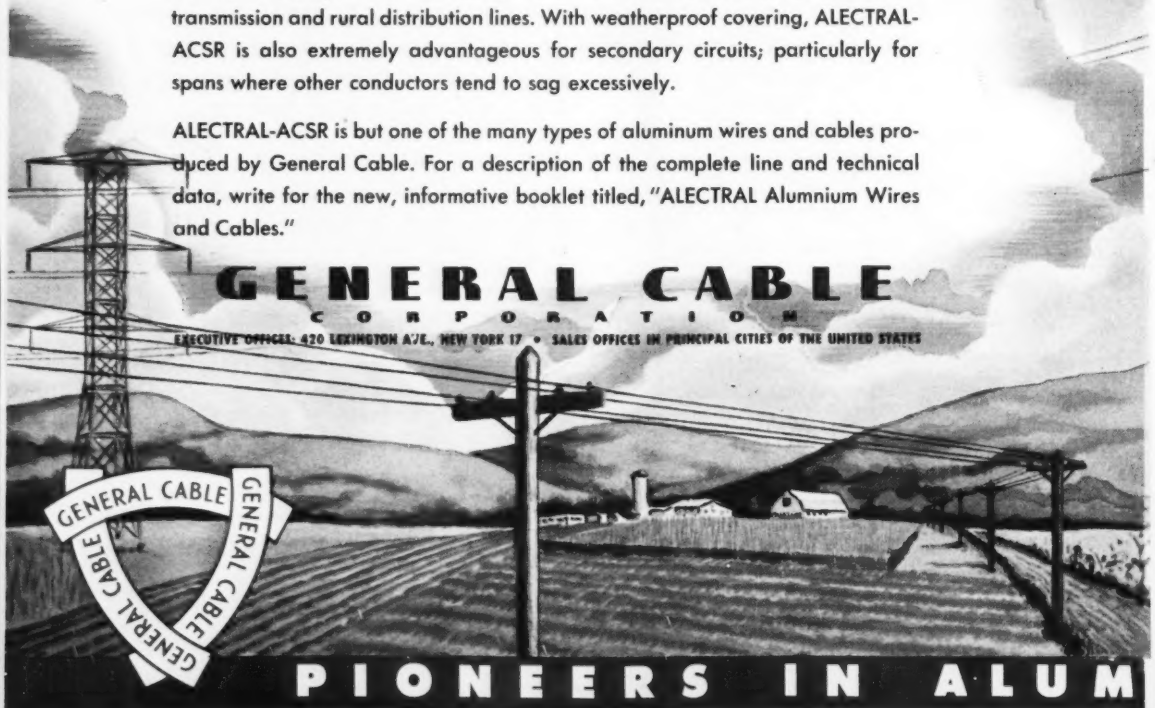
"More Power to You" ®

The General Cable line of ALECTRAL aluminum wires and cables has earned definite acceptance among engineers everywhere. Of special interest to the electrical industry is ALECTRAL-ACSR. As a bare conductor, it is most useful for transmission and rural distribution lines. With weatherproof covering, ALECTRAL-ACSR is also extremely advantageous for secondary circuits; particularly for spans where other conductors tend to sag excessively.

ALECTRAL-ACSR is but one of the many types of aluminum wires and cables produced by General Cable. For a description of the complete line and technical data, write for the new, informative booklet titled, "ALECTRAL Alumnium Wires and Cables."

GENERAL CABLE
CORPORATION

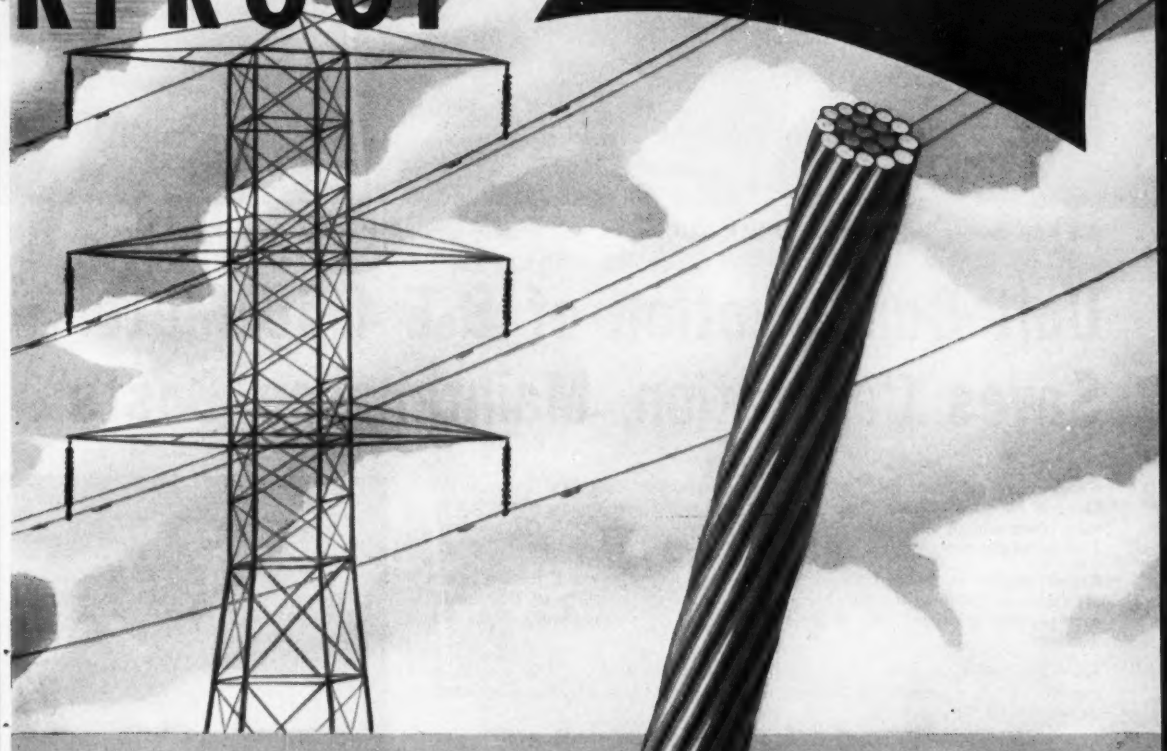
EXECUTIVE OFFICES: 420 LEXINGTON AVE., NEW YORK 17 • SALES OFFICES IN PRINCIPAL CITIES OF THE UNITED STATES



PIONEERS IN ALUM

RAL ACSR

RPROOF



ALECTRAL-ACSR

CONSTRUCTION

One, two or three layers of hard drawn aluminum wires of suitable size to give desired electrical characteristics are laid over a core of extra high strength, galvanized steel wire or strand.

WEATHERPROOF COVERINGS

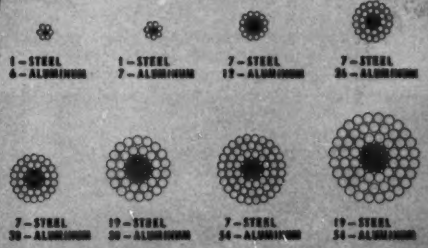
POLYETHYLENE—Of a low specific gravity, pigmented, light and heat stabilized polyethylene compound having high dielectric properties and excellent resistance to moisture and weather.

"O.K."—URC & "PEERLESS" URC—Asphalt-saturated, fibrous coverings in both double and triple-braid weights or Peerless construction.

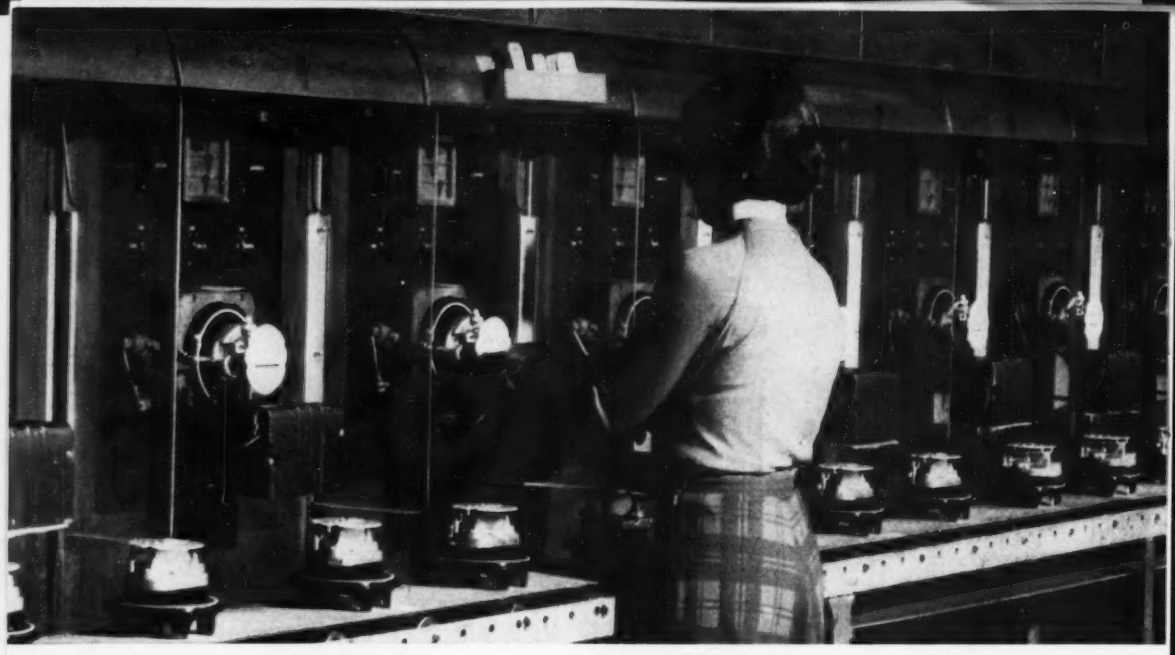
"TIP-TOP" (Neoprene)—Tough, durable, weather-resistant, vulcanized neoprene compound. Minimum tensile sheath strength of 1600 psi.

"ALECTRAL", "O.K.", "PEERLESS", AND "TIP-TOP" ARE REGISTERED TRADEMARKS OF GENERAL CABLE CORP.

TYPICAL STRANDINGS



INUM WIRE AND CABLE



G-E I-50 meters, in final factory test. I-50's save you metering costs in many ways. Here's how . . .

Unit Construction of G-E I-50 Meter Saves Calibration, Maintenance Costs

From cover to base, ***integral units*** of construction simplify the certified General Electric I-50 watthour meter. Because no movement of parts can take place within these units, calibration remains stable and the inherent I-50 accuracy is sustained.

Result: As far as the certified I-50 meter *itself* is concerned, testing costs are reduced. Calibrating time is cut. The long-term stability of I-50 accuracy permits a longer time between periodic tests. Maintenance costs are lessened.

For more information on the savings offered by the certified I-50 watthour meter, call your nearest G-E representative. *General Electric Company, Schenectady 5, New York.* 601-89

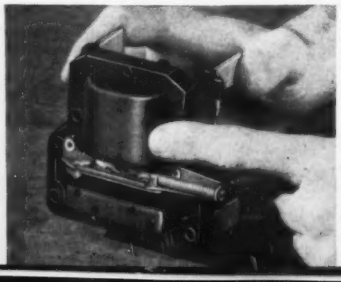
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

GENERAL ELECTRIC

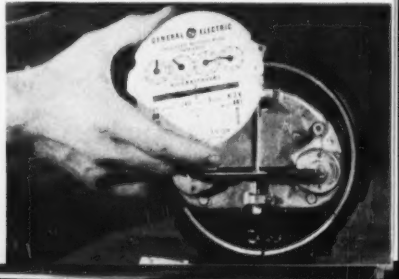
RETARDING MAGNETS of Alnico V are die-cast into frame, firmly fixing them to prevent movement, stabilize calibration.

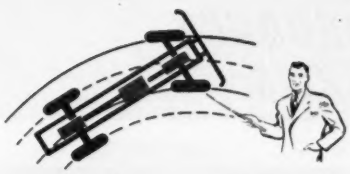
STURDY, ONE-PIECE FRAME aligns all operating parts. Four knurled rivets hold stator to frame and prevent movement.

MOLDED COIL INSULATION securely holds coils to laminations, eliminates movement and calibration change in stator.

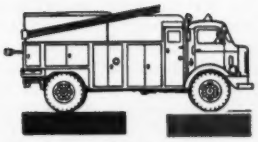


UNIT CONSTRUCTION OF REGISTERS— both pointer and cyclometer — gives mechanism having inherently low friction.





Fully Compensated Drive... three free-acting differentials compensate for the difference in travel of all four wheels. Reduces drive line strains, eliminates needless tire wear.

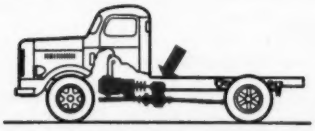


Proper Weight Distribution . . . only a true 4x4 gives you the added weight on the front wheels needed to gain the necessary traction to speed utility line work regardless of weather or terrain.

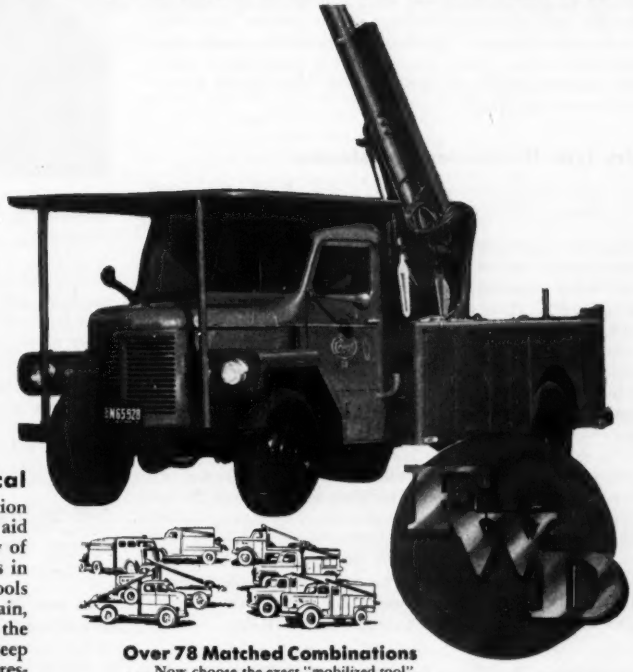
Utilities helped design 'em

. . . another reason why FWD offers all these work-speeding, cost-cutting advantages

Full Torque P.T.O. . . . utilizes full engine power through all transmission speeds. An exclusive safety lock prevents truck drive while boring operations are proceeding.



Two-Speed Aux. Transmission . . . doubles the number of transmission gear ratios. Provides low gear ratio for full power at extreme low speeds needed for tough, cross-country operations.



Over 78 Matched Combinations . . . Now choose the exact "mobilized tool" that meets your requirements . . . and deal with *only one* source for complete service and supply.

Faster, Safer, More Economical

FWD "mobilized tools" for line construction and maintenance were designed with the aid of utility men for utility service. This policy of *"building in"* features that you want, results in superior equipment that gets crews and tools to the job in a hurry in spite of weather, terrain, or bad footing. See your FWD Dealer to get the facts on how FWD "mobilized tools" help keep construction on schedule . . . speed service restoration . . . earn more for your equipment dollar. THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis. — Kitchener, Ont.

Built by the makers of America's Foremost Heavy-Duty Trucks

PRODUCT NEWS

Flat-Sided Conduit

(1) Soapstone Duct Co., 110 Linfield Drive, Menlo Park, Calif.

Nonmetallic conduit for concrete encased underground power and communication circuits is available in flat-sided design to permit multiway duct systems to be built up quickly and accurately without use of spacers. According to the manufacturer, the new conduit has the same characteristics as its round conduit and is particularly suited for communication and power circuits that do not require wide spacing between ways.

Dry-Type Distribution Transformer

(2) Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

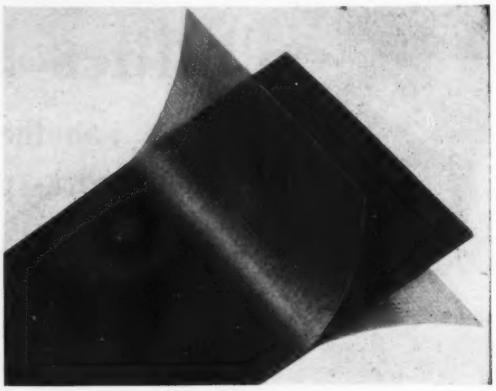
The new type enclosed nonventilated dry-type distribution transformer for service on secondary circuits rated 600 v and below supersedes the type AJR line. This transformer uses Hipersil cores and Class H silicone insulation; operates at 120 C rise. Both high- and low-voltage leads are brought to Micarta laminated plastic terminal boards at the bottom of the case. Since the temperature of the terminal compartment is less than 30 C, standard insulated cables can be used for wiring through conduit. Conduit knockouts are located at the bottom of the case walls.

In addition to the 3-, 5- and 10-kva AJR sizes superseded, the type E will be built in 15-, 25-, 37½- and 50-kva ratings. The three smaller sizes are designed for indoor or outdoor service and wall mounting. Ratings above 15 kva, for both indoor and outdoor service, are for floor or platform mounting, though the 15- and 25-kva units can also be wall mounted. This transformer meets Insurance Underwriters' requirements for the textile industry and is approved by Underwriters' Laboratories.

Aluminum Bus Bars for Power Distribution

(3) Trumbull Electric Department of General Electric Co., Plainville, Conn.

Aluminum bus bars, now being used extensively in Flex-A-Power feeder or plug-in electrical distribution systems, weigh from 30 to 70% less than those using copper, according to the manufacturer, and sections that normally required a crane to hoist can be handled without mechanical assistance. Other advantages claimed for aluminum bus bars are high transmission efficiency, since the a-c resistance is extremely low, minimum voltage drop and availability. The new aluminum LVD-5 line of busways has been Underwriters' listed for the following ratings: from 600 to 4,000 amp at 600 v or less for 2-pole, 3-pole, 3-phase 4-wire and 4-pole systems. The FVK line with aluminum bus bars is available in ratings of 225, 400, 600 and 800 amp at 600 v or less.



Insulating Material

(4) Natvar Corp., Woodbridge, N. J.

Developed for use in heavy-duty equipment and subject to abuse and overloads in normal service, Aboglas insulation is a new Class B composite insulation consisting of a layer of varnish saturated asbestos paper sandwiched and securely bonded between two layers of varnished open-weave Fiberglas. It is said to be tough, flexible and less expensive than mica combinations and other Class B insulations. It does not flake and conforms to irregular surfaces without application of heat. Comes in two thicknesses: .025-.027 in. and .050-.054 in.

Self-Sealing Varnished Cambric Tape

(5) Electro-Technical Products Division of Sun Chemical Corp., Nutley, N. J.

The new Stick-Var tape is claimed to grip and seal as it is applied without need of added adhesive or processing and to give high dielectric capacities equal to comparable nonadhesive varnished cambric. Bias weave gives added strength and greater moldability, it is stated. Distributed in the West by Tri-State Supply Corp.

Fill in the Coupon on Page 66

Type WN Switch

1. Flanged Mounting Base.
2. Free Swinging Clamp.
3. Easy Shaft Installation.
4. Easy Adjustment.

Here's an Easier Way
to install Gang-Operated Switches

CHANCE WN-VN SWITCHES

permit quick installation of interphase shaft without "threading"

Chance Tilting Insulator Switches for outdoor gang operation give you always reliable switching under all conditions. The reason? . . . Such operating advantages as the exclusive Compensator Control Mechanism that means positive performance under all conditions—"Crow Bar" Leverage that breaks heavy ice with ease—Compensation for structural warpage—and *New Ease of Installation.*

WN-VN Switches *are* easier to install than any other gang-operated switches. The arrows in the illustration above point out the features that make installation simple.

1. The flanged base has double slots and slotted holes for ready installation on all standard construction. (Front mounting brackets are supplied for steel structures.)

2. The clamp on each switch swings open to permit the interphase shaft to be laid in position *after* the switch units are mounted.

3. The interphase shaft bar is then inserted in all three phases at once—without the necessity of "threading" through small fittings.

4. Easy adjustment (only necessary under unusual conditions*) is accomplished by pulling the stainless steel pin which connects the compensator control rod, loosening the lock nut (4), and turning to adjust.

All control connections on Chance WN-VN Switches are made with clamp type fittings for maximum flexibility.

Rugged "torture rack" tests prove that the performance of these switches is not affected by any conceivable warpage of cross-arms—Ice tests prove their exceptional ability to open and close without difficulty when coated with over ¾" of hard, clear ice. Chance WN-VN Switches can be isolated, while energized, with Hot Line Tools for live line maintenance.

For reliable switching *plus* time saving installation advantages, specify Chance Type WN or VN Switches.

Send for complete catalog information or test data or consult Section 11B of your Chance catalog.

**All WN or VN switches are factory adjusted for proper contact and gap clearance before shipment.*

You know it's RIGHT when you specify CHANCE

ABC INDUSTRIES

A·B·CHANCE CO·

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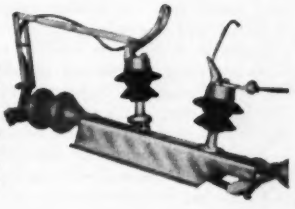
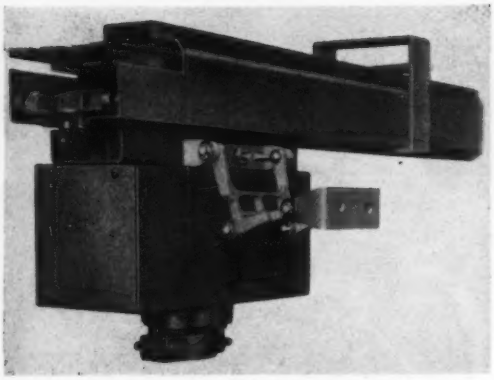


Chance Type VN 200 Amp. Switch. A two-insulator tilting type switch built for service and economy.

C52-10



Heavy-Duty Trolley Power Distribution

(6) Feedrail Corp., 125 Barclay St., New York 7

The manufacturer's heavy-duty trolley busway electric power distribution system formerly made as a specialty item is now offered in standard stock. The systems are rated 250, 375 or 500 amp, 250 v d-c, 575 v a-c, single or three phase and are designed to provide a movable source of power for long runs of heavy moving electrical leads.

Power take-off trolleys run in a steel housing that encloses the current-carrying bus bars. Standard factory-fabricated enclosed bus bar sections and accessories combine to make a run of any length. Allowance for unequal expansion between the copper bus bars and the steel track housing has been provided. Door track is available for inserting trolleys quickly and safely without shutting off the power. Standardization allows for matching future plant growth or rearrangement of the electric distribution system, the manufacturer states. All current-carrying parts are enclosed for safety and aisles and work areas are kept clear since only short overhead cable connections are required, it is pointed out.

Catalog 30 gives detailed information.

Multioutlet Raceway System

(7) Wiremold Co., Hartford 10, Conn.

Claimed to be the first single raceway system designed to accept all three wiring services, Plugmold 2000 provides convenience outlets every 30 in. in a continuous run; is holecut to receive the manufacturer's prewired Snapicoil with NEMA grounded receptacles, Duplex 2-wire receptacles, both hot, or Duplex 3-wire receptacles with one side switched and one side hot.

Required lengths of base are mounted to the wall surface in one continuous run; Snapicoil receptacles prewired in 50-ft lengths are snapped into the holecuts in the raceway cover; the cover with receptacles inserted is then snapped into the base. A few fittings complete the job. No special fittings are needed to feed Plugmold 2000. Knockouts for feed-in are provided every 7½ in. along the base. Knockouts for wood screws are provided every 1¼ in. so that attachment is easy to standard stud spacing or any irregularities in studs, the manufacturer states.

The 50-ft Snapicoils are provided with NEMA grounded receptacles, Duplex 2-wire or Duplex 3-wire receptacles but they can be intermixed by the electrician by removing one type and splicing another, it is pointed out. In addition to the standard Plugmold with outlets every 30 in. on centers, clusters of very closely spaced receptacles and factory prewired and assembled short lengths with receptacles on 6- and 18-in. centers are available.

New Trade Name for Expanded Line

(8) National Electric Products Corp., Chamber of Commerce Bldg., Pittsburgh 19, Pa.

Two new high-temperature wires claimed to withstand operating temperatures of 90 to 105 C have been announced under the manufacturer's new trade name Nepconol, which will replace NE'on for building-type wires. The new name will cover type T, for Loomwire nonmetallic sheathed cable; type TW for use in wet locations in place of lead-encased cable and three hot-spot wires, including the two new high-temperature types. Also to be produced under the new name are fixture wires in types TF, solid or stranded, and TFF, flexible, for 600-v service up to 60 C.

Three-Wire Caps

(9) Rodale Mfg. Co. Inc., Emmaus, Pa.

For use with the new grounding-type outlets, these 3-wire caps have a U-shaped grounding blade that prevents engaging with current-carrying contacts. The longer blade is said to provide grounding connection before current-carrying blades make contact. Catalog 576 has a Bakelite body completely armored and catalog 579 is made of soft unbreakable and shockproof rubber. Both caps have a metal cord clamp coated to resist rust and corrosion. The device is rated 15 amp, 125 v; cord hole diameter is .218 to .630; OD, 1½ in.

Two-Way Radio Equipment

(10) Motorola Inc., 4545 Augusta Blvd., Chicago 51

A locally controlled base station housed in a desk-top cabinet is designed for use in the 450- to 460-mc range as well as the 460- to 470-mc range, the Citizen's Radio Band. It is the companion of the previously released mobile unit. The unit designed for the 450- to 460-mc band has a nominal power output of 20 w. It incorporates a number of features of the equipment designed for lower frequencies, including the Sensicon receiver design with triple I.F. conversion and Permakay filter. The receiver incorporates automatic frequency control and the manufacturer's patented noise compensated squelch circuit. The transmitter contains the patented Instantaneous Deviation Control circuit, restricting deviation to the FCC limit.

NO ACROBATICS in lamp changing with—

APPLETON V-51 VAPORTIGHT FIXTURES

WITH MALLEABLE IRON BODIES
100 WATT OR 150/200 WATT UNITS

Change lamps at the work bench!

Here's a vaportight lighting fixture that sets a new high in safety, efficiency, ease of installation and maintenance! In the V-51, an exclusive "Unit Assembly" combines receptacle, globe and guard in a *single unit* . . . instantly detachable—without tools—for relamping or cleaning.

Reflector is quickly attached or removed—thanks to exclusive neoprene rubber ring suspension. Shock-absorbing socket in "Unit Assembly" permits the use of standard type lamps.

The new V-51 line includes 18 different types of rugged malleable iron bodies for pendent, ceiling or bracket mounting. *Complete interchangeability of parts* permits the assembling of 256 complete fixtures, using only 32 basic components!

Malleable Iron Fixture Body ½" or ¾" Hubs
APPLETON
Neoprene Rubber Ring Attachment
One of Four Reflector Styles Baked Porcelain Enamel Finish
APPLETON
Patent Applied for
Exclusive Unit Assembly (Receptacle—Globe Guard)

Write for Bulletin 5-A containing complete details on the new Appleton V-51 Convertible Vaportight Fixture.

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San Francisco — Seattle — Portland
Los Angeles Rep.: BRACKEN SALES AGENCY
Indoor & Outdoor Lighting for Every Need

New Spool Design

(11) Porcelain Products Inc., Findlay, Ohio

A new patented Four-in-One spool is designed to avoid a tangle of wires at multiple service secondary take-offs at poles. It is claimed to save more than a foot of conductor on each drop, to eliminate possibility of feed backs and to reduce radio interference. According to the manufacturer, shock hazards to linemen are reduced, adequate insulation is provided between each conductor and even distribution of sag is possible. Either service or secondary changes can be made without one interfering with the other. All wire holes are contoured to prevent conductor damage. Available with or without reinforcing band.

Fitting

(12) Adalet Mfg. Co., 14300 Lorain Ave., Cleveland 11, Ohio

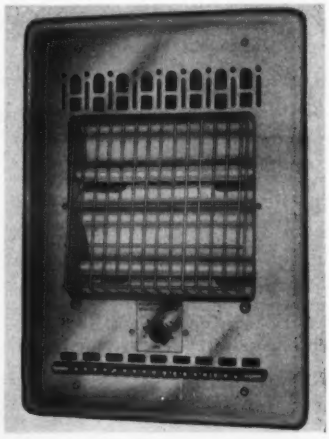
A converter piece to hold a loop of cable has been developed for the Sky-Tie quarter-bend cable clamp. It assembles inside the clamp and accommodates two pieces of cable. Where power is transmitted by means of bus-duct and bus-drop cable, the Sky-Tie clamp serves as a support at the overhead point of suspension and as an anchor at two points of the installation, the busway and the machine tool. It is a two-piece device, joined by two heavy bolts. A spring at the point of suspension fits on the device tangentially to its bend, tying back to a structural member to insure tautness of cable and to absorb vibration and shocks.

The Duplex converter piece will accommodate looped cable and eliminate cutting cable where shorter lengths from the bus duct are required. As a further improvement springs come in two sizes for the two sizes of fittings.

Center-Break Switches

(13) Delta-Star Electric Co., Division of H. K. Porter Co. Inc., 2437 W. Fulton St., Chicago, Ill.

A line of PMK horizontal center-break switches incorporates a new contact assembly featuring independently sprung pressure applying springs, a new bronze ball-bearing swivel terminal, insulator bearings with non-rusting, double-race, stainless-steel ball bearings. The PMK-22 switch has a direct linkage connection between the two rotating insulators; the PMK-23 has a center bearing with a toggle linkage between the two rotating insulators. They are available in all standard voltage ratings from 7.5 to 161 kv and in ampere ratings of 400 (up to 46 kv), 600 and 1,200 amp for upright and inverted mounting. Publication 5205 gives details.



Automatic Control on Heater

(14) Markel Electric Products Inc. and La Salle Products Inc., Buffalo, N. Y.

Automatic thermostatic control has been added to the 1,000-1,500-w 240 series of wall-insert Heetaires. The thermostatic control dial is set at desired temperature and the heater automatically produces and maintains any desired temperature between 40 and 85 F. Series 240 also comes with manual control. The entire series has highly polished chromium-plated reflectors, comes in Nuchrome, ivory enamel or brown enamel finish.

(For bulletins, fill in the coupon on page 66)

Copper and **Aluminum** insulated conductors	**ACSR** transmission and distribution
Copper and **Aluminum** line wire and service cables	**Copper, Aluminum** and **Copperweld*** bare and weatherproof

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This program, performed by our highly skilled crews, can save your system hundreds of thousands of dollars in REPLACEMENT COSTS by
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Treatment charge is as low as 4% of replacement costs and pole life is extended for approximately 8-10 years.
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Pin-Type Lampholder With Weatherproof Socket

(15) John I. Paulding Inc., New Bedford, Mass.

This new weatherproof pin-type lampholder permits use of various types and sizes of wire including No. 10 and eliminates need for stripping, splicing, soldering or taping, the manufacturer states. Pinpoint contact is positive; punctures are so small that neither insulation nor wire suffers injury, it is stated. Both wire and lampholders may be used many times. The new device passes the Underwriters' crush test.

Fan on Wheels

(16) Hartzell Propeller Fan Co., Piqua, Ohio

A wheel-model utility fan is mounted on a handled steel rod framework with 15-in. metal wheels. It is cradled so that sufficient weight is borne by the rear supports to prevent "walking," yet permits even the largest models to be wheeled without excessive weight on the handles, it is stated. This fan comes in 24-, 32- and 36-in. sizes.

Lead-Lag Ballast

(17) Jefferson Electric Co., Bellwood, Ill.

A lead-lag ballast for two 40-w rapid-start lamps is claimed to have these advantages over series circuit ballasts: independent lamp circuits, normal operation of ballast and remaining lamp if one lamp should fail, instant spotting of faulty lamps and maximum stroboscopic correction. In addition, the ballast, cataloged 254-601, is said to be quiet, is as small as present series types and weighs about 6½ lb.

(18) **PHOTOFLASH BATTERY** — General Dry Batteries Inc., Cleveland 7, Ohio, has a new photoflash battery line including a D cell claimed to produce electricity for 900 or more individual flash pictures.

TAILOR-MAKE YOUR OWN
CONDUIT OR PIPE BENDS
RIGHT ON THE JOB

. . . simple, quick with the GREENLEE HYDRAULIC BENDER

Yes, quickly make bends *exactly* as you want them, when you want them, where you want them. Compact, portable GREENLEE Hydraulic Pipe and Conduit Bender lets you do this in a jiffy. *One-man operated* to produce smooth, accurate bends in just a few minutes . . . in pipe up to 5", rigid and thin-wall conduit, tubing, busbars. Owners report time savings up to 60% or more, elimination of cost for manufactured bends and fittings, and "clean", tailor-made installations every time. Get facts now on this time-saving tool that often pays for itself on first few jobs! Write for free Bender Booklet, Greenlee Tool Co., 1771 Columbia Ave., Rockford, Illinois.

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Other GREENLEE timesaving tools for electrical work: Hand Benders; Joist Borers; Cable Pullers; Knockout Tools; Auger Bits and Drills.

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Neoprene Boot Simplifies Installation!

Only Allis-Chalmers Switchgear Uses This Method of Bus-Joint Construction

USERS OF ALLIS-CHALMERS Switchgear make or inspect bus joints in a fraction of the time and with none of the mess involved with any other switchgear. Best of all, it's a strong, corona-free joint meeting full impulse levels.

See how simple it is to make the bus joint. It's as easy in the field as it is in the factory. And note the construction details of these rigid joints.

This is but one of many advantages of Allis-Chalmers Switchgear. Get the full story from your nearby Allis-Chalmers district office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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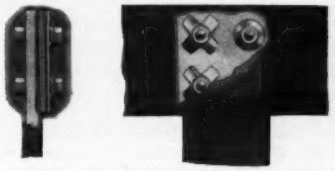

HERE'S HOW BUS JOINT IS MADE

1. Bus bar connections are of round edge copper bar with at least 98 percent conductivity. Connections are silver plated to reduce contact resistance, and prevent overheating and oxidation. A combination of spring washers and lock washers assures proper contact of bars at all times. Slotted bolt holes permit expansion and contraction of bus... relieve strain on structure.

2. No-corona tape of copper mesh material is applied around the bolts and the overlapping joint. This eliminates corona in the connections and provides a uniform base for the Neoprene rubber boot. Special Neoprene boot with potential transformer tap is provided. A few turns of electrical tape hold the boot in place. No fuss, no muss, no liquid compounds.

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for true economy in street light control

THE FISHER-PIERCE PHOTOELECTRIC CONTROL

• LOW INITIAL COST
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The *cost* of control of street lighting includes more than just the price of the control itself. Cost of installation is another major factor. Maintenance costs, if too great, can overcome all other economies.

The F-P Series 63300B Control combines *all three* elements of economy. No control of similar specifications has as low a purchase price. None requires fewer man hours for installation. No other control has equalled the F-P record for maintenance economy.

Fisher-Pierce is able to provide this economy in street lighting control because of its years of experience and its extensive engineering organization. Fisher-Pierce Controls have been proven by the experience of over 700 utilities now using more than 35,000 Fisher-Pierce units.

If you are considering adding to or modernizing your street lighting, be sure to investigate the possibilities of Fisher-Pierce photoelectric controls.

Write for Bulletin 63300B.

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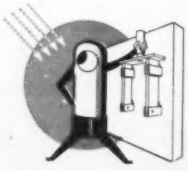

Set-Screw Wire Connector

(19) Holub Industries Inc., Sycamore, Ill.

A new set-screw-type wire connector consists of two parts, a solid brass sleeve with set screw and a Bakelite shell. To splice two or more wires, the stripped wires are inserted into the sleeve, the screw is tightened with a screw driver and the Bakelite shell is placed over the entire joint and screwed on. Sleeve and set screw are of solid brass to prevent corrosion. Underwriters' approval includes both solid and stranded wire and combinations of both. The small size MA-1 is approved for two No. 18 up to one No. 14 with two No. 16 and one No. 18 wires, and the large size MA-2 for two No. 10 up to three No. 12 with one or two No. 16 wires.

The wire splice may be inspected by unscrewing the protecting shell. In event of a change in the wiring, the connector may be removed and used for making the new splice.

Silicone Resin

(20) General Electric Co., Chemical Division, Pittsfield, Mass.

A silicone resin for Class H electric insulation is claimed to maintain its bonding strength and hardness at temperatures 50-90 C above any known commercially available silicone resin. Designated as SR-98, the product is said to permit greater design flexibility in motors, transformers and generators where vibration is a factor. It is supplied at 50% solids content and is light amber in color; may be thinned with xylene, toluene or petroleum spirits. No catalyst is required.

Plastic

(21) Dow Chemical Co., Midland, Mich.

A new heat-resistant addition to the Styron family of plastics is Styron 700, a material that when properly molded withstands temperatures as high as 220 F. Other physical properties are said to be equal to or better than those of general-purpose polystyrene.

(22) **COMBINATION**—A ceiling heater, light and ventilating fan is in production by NuTone Inc., Madison and Red Bank Roads, Cincinnati, Ohio. This new Heat-A-Lite contains an 1,800-w heating element, will heat areas up to 575 cu ft; constantly recirculates warm air. It is installed in the ceiling, comes in four models: white and chrome; chrome; white and chrome finish with wall plate, three switches and neon pilot light; chrome finish with individual switches, wall plate and pilot light.

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SINGLE CONDUCTOR OR CABLE

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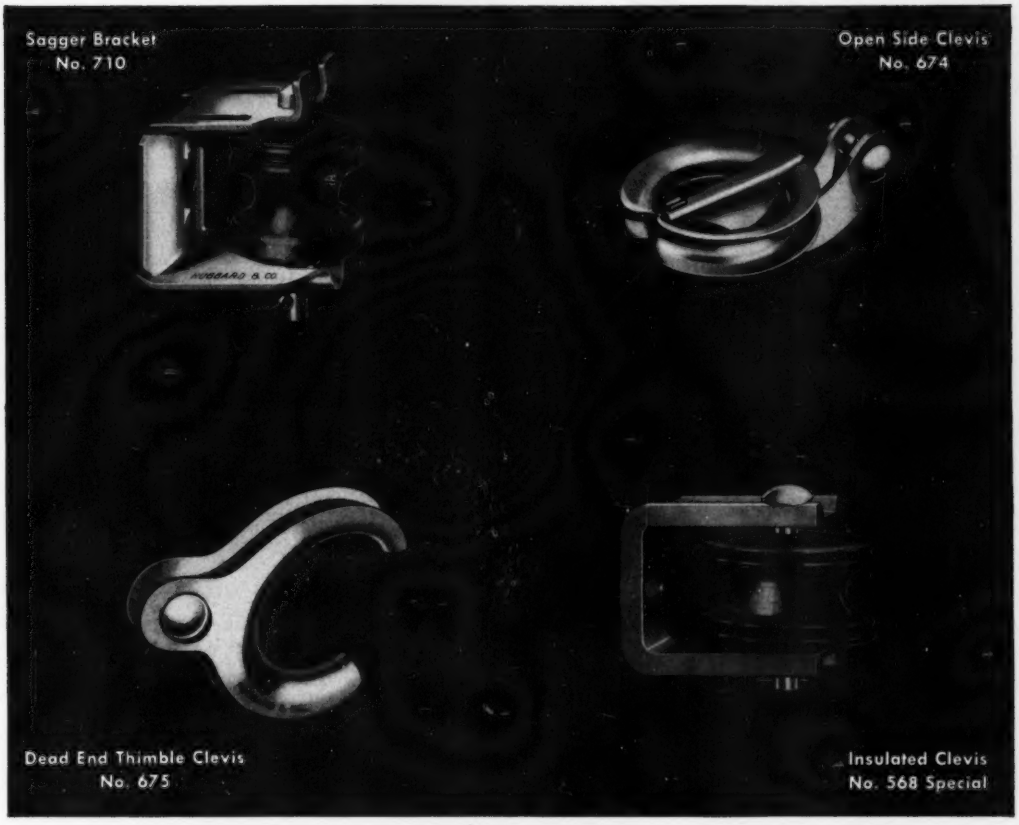

The increasing use of aluminum for single conductor cables and in ACSR has brought numerous inquiries as to appropriate clevises and other accessories on such lines. Here are a few from a large number of Hubbard items which are recommended for such use. Write for detailed information.

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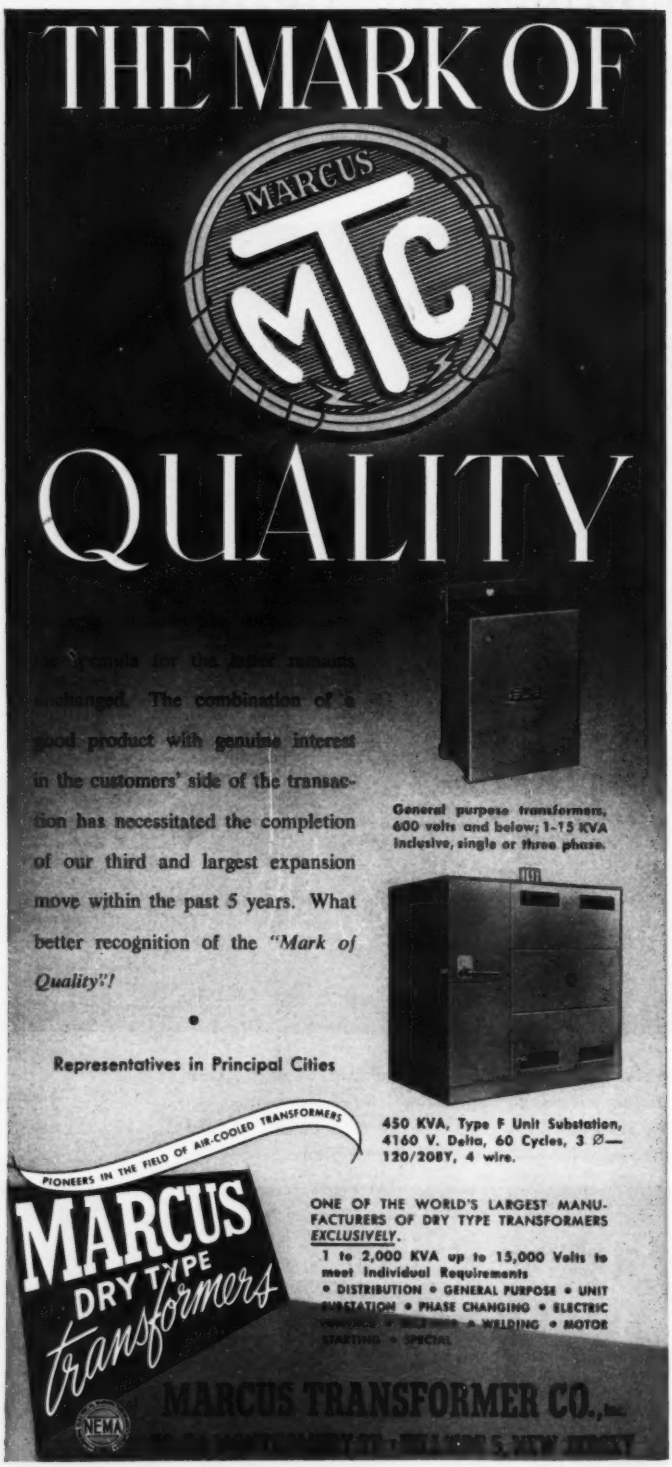
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The combination of a good product with genuine interest in the customers' side of the transaction has necessitated the completion of our third and largest expansion move within the past 5 years. What better recognition of the "Mark of Quality"!
Representatives in Principal Cities
General purpose transformers, 600 volts and below; 1-15 KVA inclusive, single or three phase.
450 KVA, Type F Unit Substation, 4160 V. Delta, 60 Cycles, 3 Ø— 120/208Y, 4 wire.
PIONEERS IN THE FIELD OF AIR-COOLED TRANSFORMERS
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transformers
ONE OF THE WORLD'S LARGEST MANUFACTURERS OF DRY TYPE TRANSFORMERS EXCLUSIVELY.
1 to 2,000 KVA up to 15,000 Volts to meet Individual Requirements
• DISTRIBUTION • GENERAL PURPOSE • UNIT
• PHASE CHANGING • ELECTRIC
• WELDING • MOTOR
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MARCUS TRANSFORMER CO., Inc.

Dust-tight Fixture

(23) Crouse-Hinds Co., Syracuse 1, N. Y.

A 300/500-w dust-tight lighting fixture approved by Underwriters' for Class II, Groups E, F, G hazardous locations has been added to this manufacturer's line. It consists of a streamlined cast aluminum canopy containing the Mogul lamp socket and inner auxiliary reflector and an 18-in. diameter Alzak-finished aluminum main reflector, which is threaded into the canopy. The fixture uses no globe; has a tempered flat glass lens spun into the edge of the reflector. The lens is said to be highly compact and heat resistant.

Luminaire

(24) Electro Mfg. Corp., 2000 W. Fulton St., Chicago 12, Ill.

A surface-mounted fluorescent fixture, the Surf-A-Lite, incorporates styrene plastic louvers and a metal reflector plate that can be removed for pendant mounting; has 45-37° shielding; comes in four- or two-lamp, 40- and 20-w models and in 4-, 6- and 8-ft slimline models. The Spring-a-matic louver action is claimed to be an easy, fast and safe device for opening and closing louvers. Two hidden springs hold the louver in place.

Diffuser Unit

(25) Leader Electric Co., 3500 N. Kedzie Ave., Chicago 18, Ill.

A diffuser unit to modify contrast between brightly lighted work areas and dark upper areas comes in open or closed styles for two or three 40-w lamps. It is of all-steel construction with reflector finished in high gloss baked enamel or porcelain enamel. It may be used singly or in continuous rows, ceiling mounted or suspended by hangers.

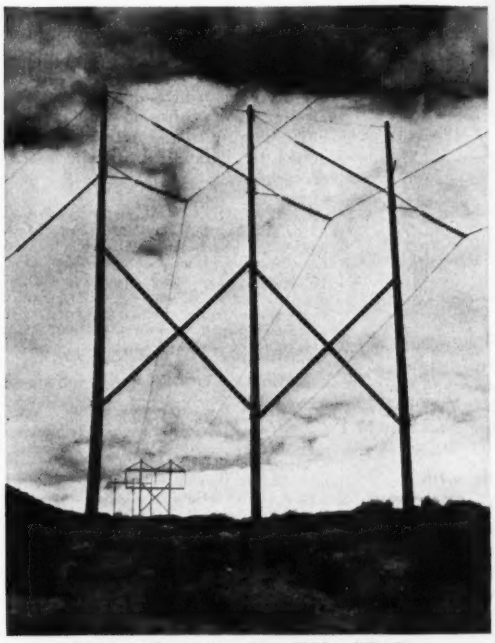
Commercial Fixture

(26) Gibson Mfg. Co., Atlanta, Ga.

A new line of open-type commercial fixtures with turret sockets is available in two- and three-lamp, 48-, 60- and 96-in. conventional and 48-, 72- and 96-in. slimline. These Chieftain fixtures have no welded sections; are finished to give resistance to oxidation where there is extreme humidity. Each section is individually phosphatized and finished with two coats of hi-baked enamel and assembled with plated screws.

Demand PROOF OF PERFORMANCE

for Superior Insulator Quality



Medium-angle structure of the 230-kv, 189-mile line of Idaho Power Company.

● Not long ago, Idaho Power Company built a 230-kv line extending 189 miles across southern Idaho. For this line, they wanted only the best of insulators.

RESULT: For use on their new line, The R. Thomas & Sons Co. was awarded a contract for 40,000 "*Quiet-Type*", 10-inch suspension insulators. Recently, 3000 more were purchased.

Thomas engineers pioneered the under-glaze process resulting in the radio noise-free porcelain insulator (Patent No. 2154387). Service records*, line and laboratory tests prove the superiority of "*Quiet-Types*" over conventional insulators.

After all is said . . . it's still quality that counts plus proper designing, precision manufacturing . . . and PROOF OF PERFORMANCE. Since the beginning of the Electrical Industry, Thomas has been supplying porcelain for the most difficult insulation problems. Why gamble?

*Available upon request.

SPECIFY THOMAS INSULATORS—THE BEST BY LINE TEST

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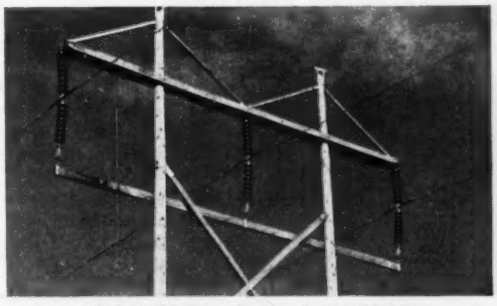

230-kv hold-down structure designed by the Engineering and Planning department of Idaho Power Company.

The R. Thomas and Sons Co.

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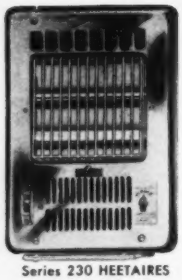
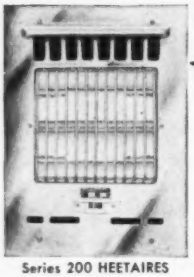


Series 230 HEETAIRES
1250 to 3000 watts



Series 200 HEETAIRES
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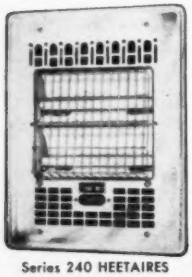

Series 240 HEETAIRES
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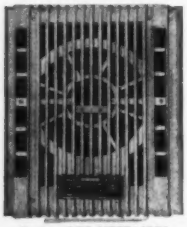
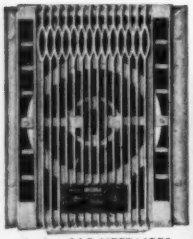


Series 250 HEETAIRES
1500 to 3000 watts



Series 210 HEETAIRES
3000 to 5000 watts

Here's how you can fill every auxiliary heating need of every BUILDER, CONTRACTOR, and HOME OWNER!

HEETAIRES . . . are manufactured in a complete range of types and sizes for every purpose . . .
HEETAIRES . . . range in wattage from 1,000 to 5,000 (120 and 240 volts), produce from 3,402 to 20,472 BTU's per hour — for light, intermediate and heavy duty.

ALL HEETAIRES are available with AUTOMATIC THERMOSTATIC HEAT CONTROLS

All HEETAIRES can produce and maintain any desired temperature between 40° and 80° F. (with only a 2° differential at all times). This insures correct healthful comfort—uninterrupedly—quickly, wherever wanted.

HEETAIRES are available in wall inserts and wall attachables — both with either built-in or external thermostatic controls.

HEETAIRES are available in three heat types — radiant heat, heated air, fan-forced radiant heat.

FAN-GLO HEETAIRES — Series 230 produce both kinds of heat — infra-red rays plus fan-forced heated air.

HEETAIRES Series 200 and Series 240 produce infra-red rays (radiant heat).

HEETAIRES Series 250, Series 210, produce fan-forced heated air.

Tested and listed under reexamination service by Underwriters' Laboratories, Inc. Thermostatic or Manual Control . . . Radiant Heat, Heated Air and Fan-Forced Radiant Heat . . . Wall Inserts and Wall Attachables.

FREE! Write for the copyrighted "A GUIDE TO QUICK HEATING"

MARKEL ELECTRIC PRODUCTS, INC.
LA SALLE PRODUCTS, INC.

148 Seneca Street, Buffalo 3, N. Y.

Incandescent Lights For Wet Locations

(27) The Art Metal Co., Cleveland 3, Ohio

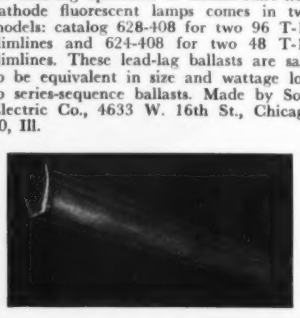
Two recessed incandescent lights for use in showers, bathrooms, on porches, etc., are designed so that a moisture-proof cork gasket is between the glass and face trim and between face trim and insert housing. The white ceramic glass has high light transmission and is contoured for uniformly white surface brightness and spread light on ceiling. Face trim and insert housing are made of corrosion-proof aluminum. The units take either a 60- or 100-w I.F. lamp and are Underwriters' approved.

(28) **BALLAST**—WAC Engineering Co., 35 S. St. Clair St., Dayton 2, Ohio, has a ballast for fluorescent lighting claimed to have low power loss, 45% power factor. It connects into 440-v circuits, is an individual lamp ballast, does not require starters. It comes in a rounded-corner leakproof potted container 8½ in. long, 3⅛ in. wide and 2¼ in. high.

(29) **LAMP HOLDER** — A weatherproof lamp holder developed by Stonco Electric Products Co., Kenilworth, N. J., uses a high-temperature, silicone rubber cushion seal claimed to withstand the highest heat to which the lamp could be subjected and adverse weather conditions in outdoor service. The cushion seal adapts itself to fit all R-40 and PAR-38 lamps. It carries UL and CSA approval for use with medium-base or mogul reflector lamps in 150-, 200-, 300- and 500-w sizes.

(30) **SPORTS LIGHTING**—Spero Electric Corp., 18222 Lanken Ave., Cleveland 19, Ohio, is offering Series A, W and Y floodlights for 1,500-w lamps. They come in open and enclosed weatherproof types; have 40 combinations of mounting and beam spreads.

(31) **BALLAST** — The Dynatran ballast for lead-lag operation of instant-start hot-cathode fluorescent lamps comes in two models: catalog 628-408 for two 96 T-12 slimlines and 624-408 for two 48 T-12 slimlines. These lead-lag ballasts are said to be equivalent in size and wattage loss to series-sequence ballasts. Made by Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill.



(32) **LOUVERED FIXTURES**—The N series of louvered fixtures is for schools, offices and public buildings, has a 4- and 8-ft unit with either plastic or metal sides, accommodates fluorescent and slimline lamps. This unit is made by Eastern Fixture Co., 170 Vernon St., Boston 20, Mass.

CONSULT G&W FOR CABLE BOXES

Practical and economical standard and special designs for splicing, interconnecting or sectionalizing cables with solid, bolted, link or fuse connections.

CABLE BOXES

Underground cable boxes are an important item in an electrical distribution system. They establish the desirable control over the duration and the extent of service interruptions. The ideal system is one which provides maximum continuity of service at minimum overall cost. The increased use of electric light and power makes it extremely difficult to arrange for even brief outages for necessary system changes and additions. Sectionalizing boxes permit circuit detours without dropping important loads. Fuse boxes minimize the extent of cable trouble. Distribution boxes provide for proper system maintenance with the least service interruptions.

No. 8523

G & W Electric Specialty Co.
7780 Dante Ave., Chicago 19, Ill. Date_____

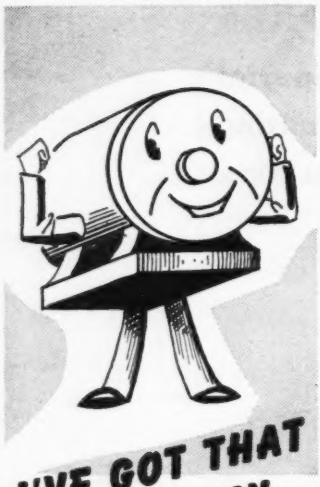
Please send me a copy of new Bulletin BA52 on CABLE BOXES—

Name_____ Title_____

Company_____

Number, Street or P.O. Box_____

City_____ Zone____ State_____



I'VE GOT THAT "EFFICIENCY OF OPERATION" FEELING!

I'M EQUIPPED WITH

OHIO MOTOR BRUSHES

We have always maintained that:—"THE HEART OF THE MOTOR IS THE CARBON BRUSH".

For thirty-six years this organization has been producing standard types and specially designed motor and generator brushes for industry. Consequently, our engineering staff possesses the "know-how" gained only through many years of experience. Write or phone us, outline your particular needs and we will promptly make recommendations that will maintain the efficiency of your motors.

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BULLETINS ETC.

(33) WIRING—A 24-page booklet, "Safety Mineral Insulated Wiring System," has been made available by General Cable Corp., 420 Lexington Ave., New York 17. It contains a history and detailed explanation of the characteristics and applications of this new system. Photographs of recent installations and a partial list of users are included.

(34) POWER FUSES—A new bulletin covering its line of extra-heavy-duty expulsion power fuses has been prepared by Southern States Equipment Corp., Hampton, Ga. It is listed as bulletin 52HMH1.

(35) COOLING TOWERS—An illustrated, 36-page catalog on cooling towers is offered by Foster Wheeler Corp., 165 Broadway, New York 6. Details of construction and charts are included. An inquiry data sheet allows for requirement planning.

(36) WALL LAMPS—A new Wallamp catalog, showing 38 units, has been released by LaSalle Products Inc., 145 Seneca St., Buffalo 3, N.Y.

(37) SIGNAL—A 4-page folder from Hammarlund Mfg. Co., 460 W. 34th St., New York 1, describes a new signaling unit, the DSU-2 Duplex.

(38) WIRING DEVICES—An 8-page folder on its interlocking wire devices is offered by the Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn.

(39) TACHOMETERS—A bulletin describing its line of recording and indicating electric tachometers has been published by the Bristol Co., Waterbury 20, Conn. The 20-page bulletin is listed as No. 51402.

(40) SWITCHES—New PMK-22 and PMK-23 horizontal center break switches are described in publication 5205 available from Delta-Star Electric Co., Division of H. K. Porter Co., 2437 W. Fulton St., Chicago. Requests should be addressed to the New Literature Department.

(41) RACKING—An 8-page catalog on adjustable steel racking is available from Flexa Steel Products Inc., 1348 W. Washington Blvd., Chicago.

(42) LAMPS—A 16-page catalog has been released by Lightolier Inc., 346 Claremont Ave., Jersey City, N.J. Shown in room settings are traditional, provincial, transitional and contemporary fixtures.

(43) TOOL BRUSHES—Electric tool brushes are listed in bulletin 42 offered by Helwig Co., 2544 N. 30th St., Milwaukee 10, Wis.

(44) METAL FRAMING—Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, is offering a pocket-size catalog with data on how to frame, hang, mount and support mechanical and electrical equipment with its adjustable metal framing.

(45) POWER FOR STEEL—A revision of its 35-page power-for-steel booklet is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. This booklet tells of past developments in application of electric power to the steel industry, then describes advances in equipment and processing lines. Listed as B-5443.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after January 1

Please send me, without obligation, the new product information or catalogs described on the following pages and identified by numbers circled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

Advertising on page.... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

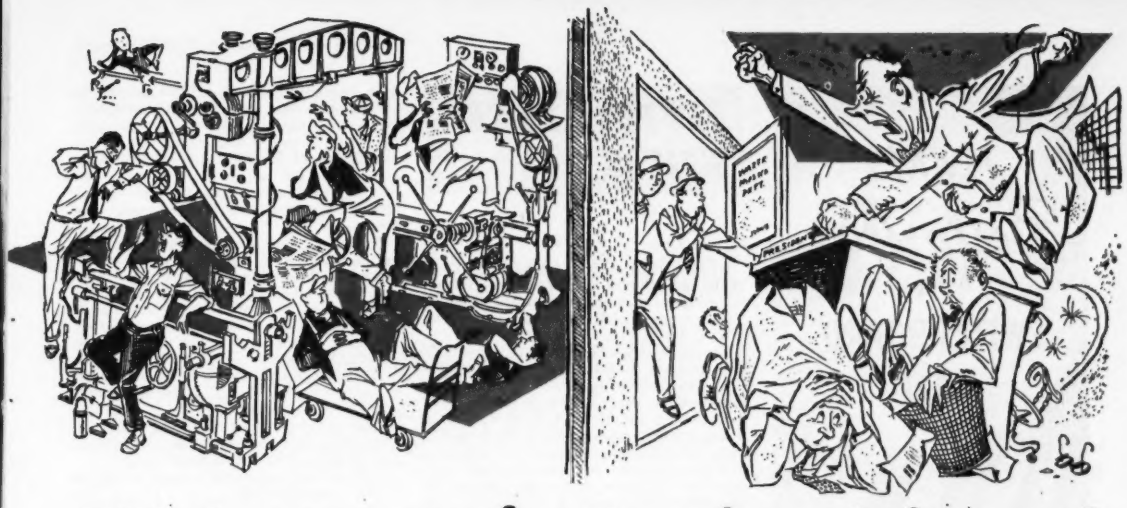
NAME.....TITLE.....

COMPANY*.....

ADDRESS.....

CITY.....STATE.....

*Please include your company's name and your position, since we cannot ask manufacturers to furnish literature unless you do.



Eliminate production breakdowns!

. . . With I-T-E CIRCUIT BREAKERS

When power interruption idles key production equipment, the tie-up is felt all along the line. While the operator waits for a maintenance electrician to restore service, other workers—from section foreman to plant production manager—see their tight production schedules being shattered.

All protective equipment is designed to shut off power as soon as any trouble develops. Circuit breakers *properly* protect costly capital equipment and allow the swift restoration of service necessary for continuous profitable production. But only a true *industrial* type breaker can meet the requirements of everyday use.

I-T-E Molded Case Circuit Breakers are designed and built for industrial use by circuit breaker specialists. They assure maximum production continuity because they:

1. Cut machine down-time. *Operators* can immediately reset breakers to restore service.
2. Are pre-tested for accuracy. When you use a circuit breaker, you *know* the calibrated value. Repeated operation will not change that calibration.
3. Will carry full rated load indefinitely. Protective value doesn't lessen with age.
4. Are completely safe for operators and maintenance men. No live parts are exposed!

There is a complete line of I-T-E Molded Case Circuit Breakers in ratings up to 600 volts a-c, 250 volts d-c, and 10 to 600 amperes. All ratings are available in four enclosure types.

For further information on I-T-E Circuit Breakers, see your local distributor, or write I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pennsylvania.

INSTALL

I-T-E MOLDED CASE CIRCUIT BREAKERS

I-T-E CIRCUIT BREAKER CO. • 19th and HAMILTON STS. • PHILA. 30, PA.

Canadian Mfg. and Sales: Eastern Power Devices, Ltd., Toronto • Export Sales: Philips Export Corp., N.Y. 17, N.Y.

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WIRE

There is a Besto-Wire for every switchboard or control apparatus application.

We manufacture types AVA and AVB switchboard wires. They have tinned conductors, varnished cambric tapes, and either cotton or asbestos braid. These wires resist flame, oil, and corrosive vapors.

Consult us for all your wire and cable needs. Write for our new catalog.

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LETTERS TO THE EDITOR

To the Editor:

It occurred to me that ELECTRICAL WEST might make some use of the following editorial that appeared in the Oakland *Tribune* on Oct. 3, under the title, "Fiat Lux":

"In every household, it is a well-known fact, there is always one parsimonious soul who feels himself appointed by higher authority to go about the house switching off lights. Even when it is a vacant room which has just been deserted by the occupant (who has every intention of returning in a few minutes) the truly inspired light-switcher will enter with gusty indignation and add another mark to the score of this one-sided game he is playing.

"In large business organizations, too, there is always one of these monomaniacs, with a perpetual affinity for darkness, who spends his spare time 'dousing the glim' in dark corridors or other strategic spots about the office.

"Inquiry at the electric company elicits the information that the expense of burning a single globe for several hours is almost infinitesimal. On the other hand, one can all too easily compute the cost of broken legs or necks which may result from the activities of a light-switcher.

"What is this sad preoccupation with gloom? Does it betoken some murky psychological background, or is it mistaken avarice, 'the last corruption of degenerate man?'

"In Heaven's name, let there be light!"

A. JAMES MCCOLLUM
News Bureau Chief
Pacific Gas and Electric Co.
San Francisco, Calif.

To the Editor:

It has occurred to me that there is a big story waiting for somebody to tell in connection with the manner in which the old, and I emphasize "old," electrical systems and wiring devices held up in both the cities of Tehachapi and Bakersfield during the earthquake. We have heard no claims of fires caused from defective wiring in either of these locations.

I think you will agree that these are two of the oldest towns in California and were using some of the pioneering wiring materials and systems introduced by the electrical industry. The fact that they stood up so well is a good write-up and might prove the point that some of us have been making for so long—that it isn't necessary to plumb the house with steel and metallic raceways if safety is the only thing involved.

H. C. RICE
Sales Manager
Southern California Edison Co.
Los Angeles, Calif.

To the Editor:

Like many another, I am a grateful recipient of ELECTRICAL WEST. Generally I first turn to the News Letter. In so doing in your September issue, I was very much surprised to read your paragraph on fair trade which stated that among others Sunbeam had re-established fair trade contracts.

I assume that you are familiar with the long, consistent fight that Sunbeam put up to maintain our retail prices under our Universal Contract system. The point of my letter to you is that there was no re-establishing of our contracts with our dealers because our contracts never went out of force. We consistently maintained our contract system during the entire price-war period.

I can say, as a young salesman with my company, that maintaining our prices, when any other line of traffic appliances you would care to name was being sold at cost down here and heavily advertised, was a long walk uphill. My company took this walk because it felt that the only way we could maintain our distribution at the retail level was to assure the dealer of a reasonable profit. I am enclosing a talk given by our president, Mr. B. A. Graham, before the Investment Analysts Club of Chicago in March of this year and preceding the passage of the McGuire bill.

I direct your attention to page 15 where he discusses fair trade.

G. S. PARSHALLE
Sales Representative
Sunbeam Corp.
San Diego, Calif.

To the Editor:

I was very much impressed by the article by Mr. Carl Taylor entitled "What Kind of an America Do You Want?" which appeared in the August 1952 issue.

I note that in the editorial section you state that reprints of this article are available. I would like very much to obtain six copies if possible.

I enjoy reading ELECTRICAL WEST. In this group we think it is one of the best.

LEWIS J. CARPENTER
Industrial Engineering Department
General Electric Co.
Schenectady, New York

To the Editor:

I have just reread Carl Taylor's "What Kind of an America Do You Want?" which appeared in the August 1952 issue of your publication. I was very much impressed with the contents and if you can spare a few reprints of this talk, I would appreciate same. I would like to hand them to a few of my acquaintances who have been living in the doldrums during these past 20 years.

S. J. ROSCH
Consulting Cable Engineer
Anaconda Wire & Cable Co.
Hastings-on-Hudson, N. Y.

To the Editor:

I appreciated receiving the reprint of Carl Taylor's talk. Please use this letter as your authorization to enter an order for 1,100 copies . . .

W. J. MAYTHAM
Pacific Coast District Manager
Westinghouse Electric Corp.
San Francisco, Calif.

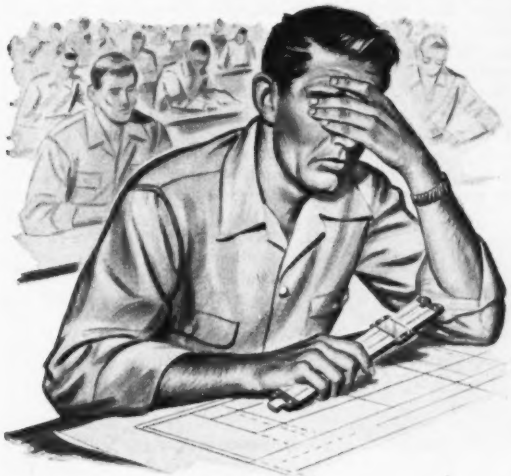
To the Editor:

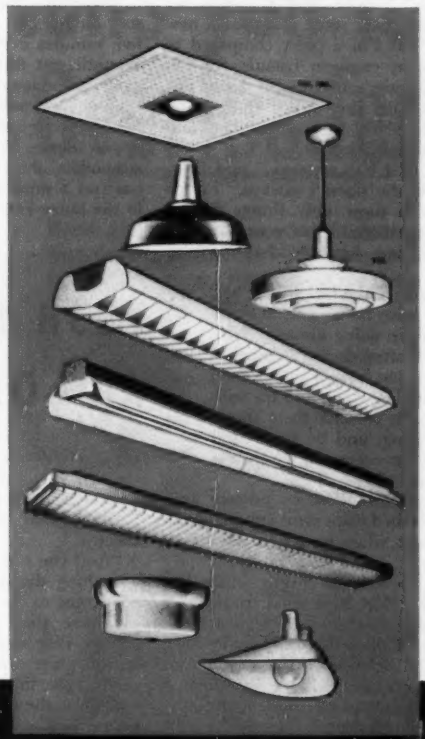
Please accept our thanks for the article on printed electrical circuits, which you sent us at the request of Mr. Wharen of the McGraw-Hill *Digest*. This information is most interesting.

B. E. STOKES
Assistant to General Factory Mgr.
Joseph Lucas (Electrical) Ltd.
Birmingham, Great Britain

GOOD LIGHTING

...as important as your most important tool

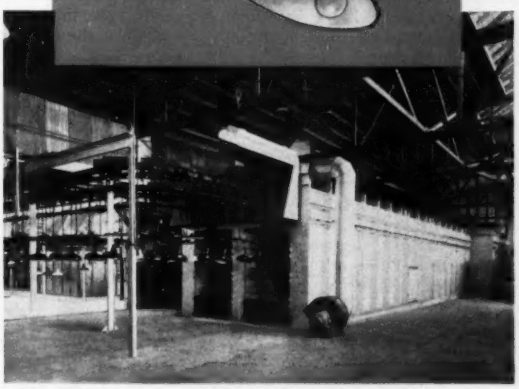




Engineers . . . draftsmen . . . designers . . . all know the slide rule is an all-important "tool"; but certainly no more efficient than their ability to make full use of it. Don't invite eye-fatigue and impair job performance with poor illumination.

Smoot-Holman lighting equipment can solve this problem—as it has for thousands of workers in other western plants. Made to exacting quality standards, it provides illumination always ample, always correct for the eyes—light that's a perfect partner for production.

Equally important, there is a Smoot-Holman fixture to match any job's specific need! See your Smoot-Holman Lighting Engineer.



All-important "tools" help assure Smoot-Holman production and quality, too. This modern porcelain enameling furnace fires on permanent "lifetime" finishes at 1600° fahrenheit.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA ®
MADE IN U.S.A.

SMOOT-HOLMAN COMPANY Inglewood, Calif. Offices in Principal Western Cities • Branch and Warehouse in San Francisco

ELECTRA'S HUSBAND

"YOU object to my ideas for turning our house into an electrical paradise," I told Electra when we were going over some plans for a new home. "But I'm a piker compared to some of my engineer friends. All I'm proposing are some simple things like switching on the lights from more than one place, for convenience, and a few things like that."

"Well if I had my way," said Electra, as if she doesn't always, "I'd do away with those ugly things on the wall altogether. I'll bet your engineer friends can't do that for me."

"I'd give you odds on that bet, for you have no idea what some of them are doing already. Why there's Walter down at our office who has two TV sets, one in the kitchen so he and his wife won't have to miss their shows while eating, and he has sound wired to every room, even the bathroom—"

"Heavens, is there no privacy anymore? Who'd want some stranger talking to him when he was in the bathroom?"

"I've heard of night clubs," I chortled, "that have loud speakers in the ladies' powder room to scare the wits out of the gals with a male voice talking to them, but that's not the case I speak of. He just doesn't want to miss the political speeches, I presume, even while shaving."

"After this campaign I'd be more likely to break all radio sets up with a hammer."

"Well I feel the same way, but listen to what an engineer in Los Angeles has in his home, will you? You want lights to go on by themselves; listen to what Ted Blakeslee does. He and his wife open the garage door by whistling to it. It can also be operated from inside the house by push button. It closes automatically when the car is driven out. They can even start the car motor and have it warmed up so that when his wife dashes out in the morning to take their daughter to school the car is warmed up rarin' to go.

"Then he has an electric timer turn on the lawn sprinkler system, after an electric wire along the edge of the lawn heats up and burns off the grass, at one o'clock in the morning."

"That would appeal to you all right," said Electra.

"Sure does, but wait. The sprinklers stay on for five minutes, then off for five minutes every hour until 5 a.m. or until, get this, the dampness indicator in the lawn shows that there has been enough and then cuts it off. And none of your sarcasm about watering, if you please. You have house plants, remember, that you forget. Well, he has run a small pipe to a planter box in the house from the sprinkler system so that it won't be forgotten."

PUSH BUTTONS ARE OBSOLETE

"Now that makes sense," smiled Electra.

"And you often say you'd like to do something drastic about the salesmen who come to the door. Well these people have that fixed too. The door chimes ring once at the press of a button, then without further pushing, three more times and then they lock out. Over the door is a speaker microphone so that Mrs. B. can ask who is there. If it is someone she wants to see she can let him in by push button. If it is someone working his way through college she can tell him 'no' without opening the door."

"Sometimes I have hopes for engineering," mused Electra.

"You talk about my few three-way light switches. They have a master panel near the door that has lights to show whether all the outside doors are locked and lights are off as they leave the house. On the other hand, they can turn on lights all over the house and yard at night if they wish, from a panel by the bed.

"When its too sunny the awning over the breakfast nook goes down automatically. Then it raises when the sun moves on later in the day.

"Of course in the sound and TV department it is just as complete. Like our own engineer, he has sound piped all over the house and time clocks to turn on the radio programs or to record them on tape to be heard at a more convenient time. His little girl can also record as she practices the violin and listen back to see how she sounded. And if either wants to listen to radio when the other wants to sleep, there's a pillow speaker to play for that one alone and an electric timer to cut it off after he's gone to sleep."

"Sounds wonderful," admitted Electra, "but you say he has push buttons all over the house. That still doesn't eliminate the switches altogether." She can be so unreasonable just to prove her superiority. But I thought I had the answer.

"Yes, he's thought of that. He says push buttons are obsolete and he's going to do away with them. He's going to replace them with a dial system, like the telephone. Everything will be given a number and they can dial whatever they want done."

"You mean to say I'd have to remember a lot of numbers? Why you know I have a time even with the telephone numbers and these silly dials. Now you want to make me get even more mathematical. You and your engineers!"

Sometimes it's hard for a man to figure out just what it is a woman *does* want. I wonder if an electronic calculator could solve that for me?

ONE thing that is never obsolete is human vanity, though—and how the advertisers play to it. As Shakespeare said of rain, it falls alike on the business man who craves prestige to sell him a Cadillac as it does on the Negro cement worker who buys one too. It is used to sell kitchens and TV sets. Some have even been known to put up an antenna without having a set so the neighbors would think they had one.

But there's an odd twist to it that came out when an engineer set himself up in a consulting practice. Should he "prestige" his office to look like an advertising agency or would that scare away business? He had noticed that his customers feared they'd be paying fatter fees to support such a front. *They* wanted to be the ones to drive up in the Cad.

A Glance tells you it's Overloaded

Read How the *Thermalite* Indicator Can Save You Money in Transformer Protection and Utilization in Any Season . . . for Any Climate

WHEN THE BRILLIANT SIGNAL LIGHT of the *Thermalite* overload indicator flashes on, you can tell — at a glance — that your distribution transformer is overloaded. There is no interruption of service. Time-saving visual detection like this can save you hundreds of man-hours on costly surveys. It will help to eliminate transformer burnouts and service interruptions.

Important Advantages Save Money

Simple in operation . . . the warning light is actuated by a thermal device in the top oil. The light snaps on during excessive overload periods and remains on until turned off by an external handle.

The *Thermalite* indicator will stretch the dollars you spend for transformer protection. It's low in original cost, dependable and requires no maintenance. It is engineered, calibrated and installed at the factory.

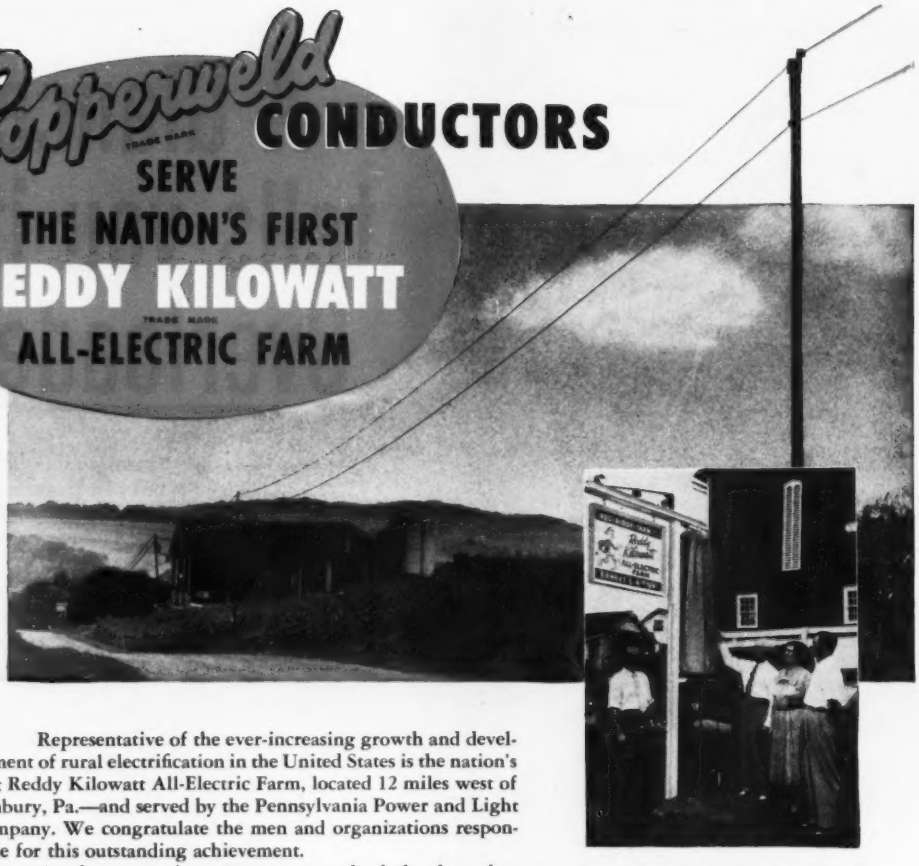
Learn more about this visual, inexpensive way of detecting transformer overloads by calling your nearby A-C sales representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3793

Thermalite is an Allis-Chalmers trademark.

ALLIS-CHALMERS

The Thermalite overload indicator is available on distribution transformers 100 kva and smaller, 15 kv and below.

Copperweld* CONDUCTORS SERVE THE NATION'S FIRST REDDY KILOWATT* ALL-ELECTRIC FARM



Representative of the ever-increasing growth and development of rural electrification in the United States is the nation's first Reddy Kilowatt All-Electric Farm, located 12 miles west of Sunbury, Pa.—and served by the Pennsylvania Power and Light Company. We congratulate the men and organizations responsible for this outstanding achievement.

At the same time, we are proud of the fact that Copperweld* Conductors were selected to carry dependable, low-cost power to this fully-electrified farm. Today, millions of miles of non-rusting Copperweld Conductors are providing reliable, trouble-free service at lowest annual cost, all over the world.

For your overhead lines, consider the many advantages offered by Copperweld—the favorite conductors of Rural America. You'll find they're unequaled in economy, long life and all-around performance. Write today for the Copperweld Engineering Data Book—there's no obligation.

*Trade Mark

Mr. Ashton B. Collins, Director of the Reddy Kilowatt Service, unveils the colorful roadside marker designating the Ernest E. Ritter Redridge Farm, near Sunbury, Pa., as the nation's first Reddy Kilowatt All-Electric Farm. Pictured left to right are: Mr. Robert T. Jones, Manager, Farm Sales Department, Pennsylvania Power & Light Company, Mr. Collins, Mr. and Mrs. Ritter.

COPPERWELD STEEL COMPANY *Glassport, Pa.*

Pacific Coast Office Monadnock Bldg., San Francisco

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3 Type PM-13 locates line faults quickly. Starts in 1/240 second, records entire disturbance, and stops after fault is cleared. Makes as many as 100 oscillograms without attention.

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The type PM-10, shown in Fig. 2, is a twelve element oscillograph which provides simultaneous viewing and recording. The PM-13 in Fig. 3 can give performance information on circuit breakers, relays, current transformers, and system stability, and can locate faults.

For more information about these three oscillographs, contact your nearest G-E Apparatus Sales Office, or send the coupon at the right for product bulletins.

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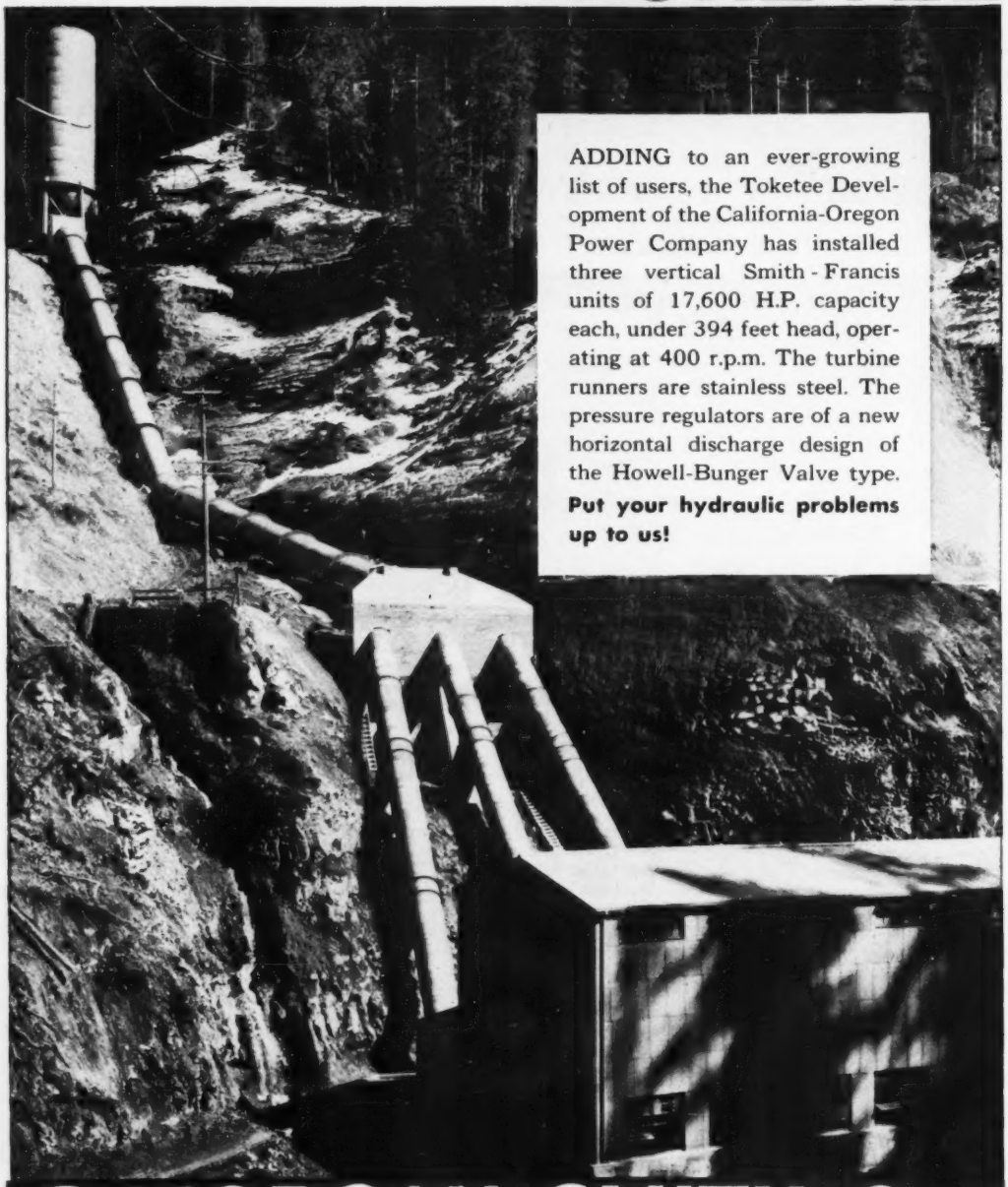

ADDING to an ever-growing list of users, the Toketee Development of the California-Oregon Power Company has installed three vertical Smith - Francis units of 17,600 H.P. capacity each, under 394 feet head, operating at 400 r.p.m. The turbine runners are stainless steel. The pressure regulators are of a new horizontal discharge design of the Howell-Bunger Valve type.

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NOVEMBER 1952 Vol. 109, No. 5

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Some Measurements of Size of the FEDERAL POWER EMPIRE

Henry B. Sargent

President and General Manager, Arizona Public Service Co.

Just a few weeks ago Charles W. Wilson, former director of defense mobilization, made a suggestion that would save the American taxpayers billions of dollars. He proposed that the federal government sell to the people its water and power dams, its generating equipment and electric transmission facilities, together with all its other business enterprises. This, he stated, would reduce the $270 billion national debt by 10%; would save approximately half a billion dollars a year interest; and would result in annual tax payments approximating another billion.

Mr. Wilson's proposal brings the immensity of the federal invasion of business into sharp focus. He shows that the federal government is in the electric power business in a big way. Just how big the federal stake in the electric business is few people—in or out of the electric industry—know or appreciate. Fewer still realize how the federal power planners are diligently laboring to double or treble the present size of the government power giant.

Let's take a look at this giant—examine his beginnings, measure his present size and look at his future proportions as now outlined by his zealous guardians.

Some measure of the size of the federal power system which Mr. Wilson suggests the public should purchase may be obtained from an examination of figures on the amount of generating capacity owned and operated by the various bureaus of the government. While these figures do not necessarily represent the full scope of the electric utility business of the federal government, they do give a fair measure of growth.

As of Jan. 1, 1952, the federal government owned 10.7% of the electric generating capacity of the United States devoted to the utility business. The situation is shown by Fig. 1. The electric generating capacity that is a part of industrial plants, and used by them for their purposes, has not been included. Such plants now total about 14,285,000 kw, and of course constitute a part of the power resources of this country, although not now a part of the utility supply.

In addition to building its own power facilities, the federal government has financed in whole or in part substantial portions of the utility plant of a number of state bodies and power districts, and all of the property of the rural electric co-ops. In some cases the federal government has retained a considerable measure of control over these facilities or the organizations operating them through restrictive contracts or loan agreements. The amount of the generating capacity of power districts, state bodies and co-ops subjugated to the federal government in substantial degree through restrictive contracts or loan agreements is as follows:

	Hydro Kw	Steam Kw	Total Kw
In service	612,000	940,000	1,552,000
Under construction	28,000	309,000	337,000
Loans authorized	4,000	229,000	233,000
Proposed	125,000		125,000
Total	769,000	1,478,000	2,247,000

None of this capacity has been included in the figures used herein as representing the extent of the federal power empire.

The federal electric power business as it is now constituted is a creature of the New Deal. In 1920 federal generating capacity was only 8/100ths of one per cent of the total utility generating capacity of this country. The generating stations involved were small and were at reclamation projects in the Far West. When the New Deal appeared in 1933, the proportion had risen to two-thirds of one per cent. What has happened since is illustrated by Fig. 2. The proportion of federal generating capacity increased rapidly during early New Deal days and throughout the war. It "leveled off" after the war, largely because the electric companies got started on their postwar construction programs more quickly than did the federal government.

The proportion started to increase rapidly again after 1949, and the forecast proportion at the end of 1954 is 13.02%.

Fig. 3 shows what has happened since the war in a somewhat different form. Starting in 1946, information on power expansion is shown in three-year periods, including a forecast for

The Federal Power Empire

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1952-1954. The diameters of the circles are in proportion to the total capacity added in each of the three periods. The slice shows how much of that capacity is federal power. Complete figures on the amount of capacity to be installed by the business-managed electric companies during the three years 1955-1957 are not yet available. However, the federal government intends to bring into service about 7 million kw during that period. If the electric companies continue their expansion program at their present maximum rate, the federal government's proportion of the total capacity to be added in the period 1955-1957 will exceed 20%.

In 1933, when the New Deal came into power, the federal government had no definitive power program as such. The socialistic platform and some of the plans advanced by certain leading socialists did, however, envision the construction by the federal government of a number of hydroelectric projects and a government transmission grid. The federal bureaus interested in federal power quickly took up the idea and, starting with the Tennessee Valley Authority as a basis, developed a nation-wide program of federal power plant construction. At the end of World War II their known program totaled 24.5 million kw. Today it totals 68.2 million kw. That's fast growth even for a giant.

Fig. 4 illustrates the contrast between the federal program as it stood in 1946 and in 1952. While today's program does include the steam-electric stations already constructed and planned by TVA and others it does not include the additional steam-electric stations that are certain to become a part of the program when the time is ripe. The distribution of this program by general geographic areas is shown in the tabulation on p 79.

The federal power program grows in size every year. New areas are invaded from time to time. Before very long every section of the country will have a prospective federal power plant located within its boundaries.

The TVA is the oldest federal electric utility in this country, and is the furthest along in its development, hav-

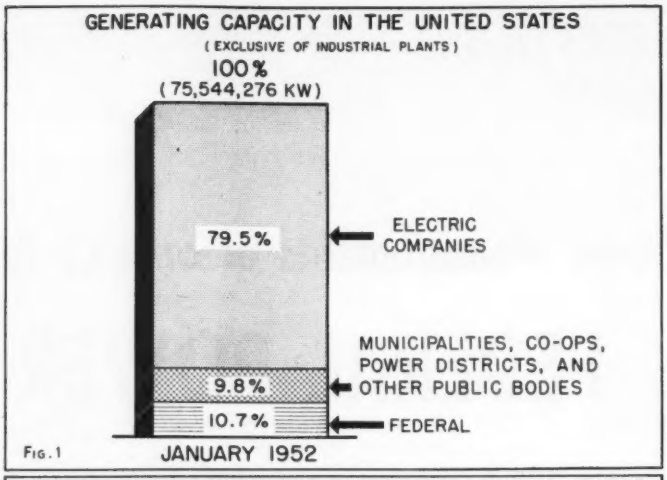

FIG. 1

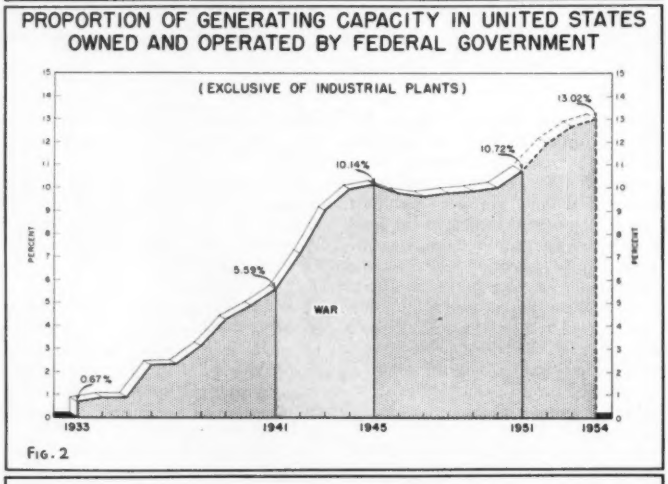

FIG. 2

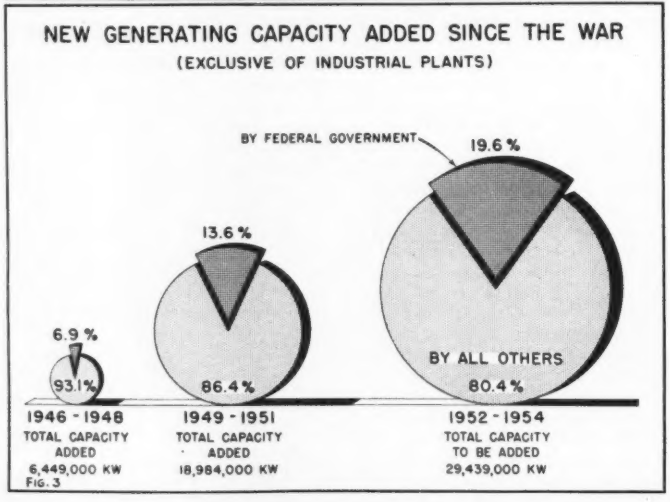

FIG. 3

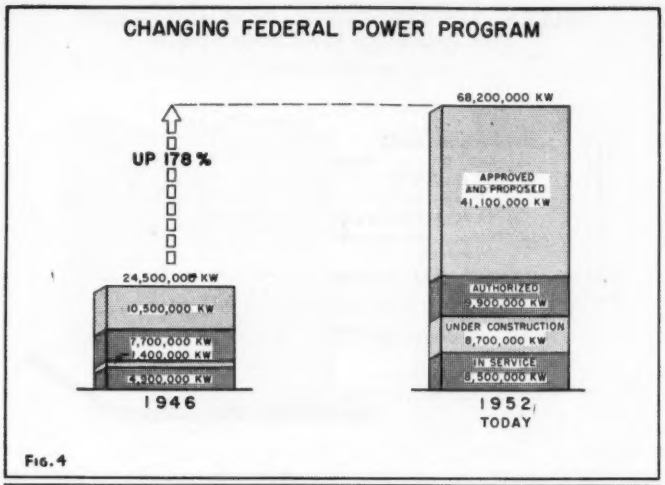

FIG. 4

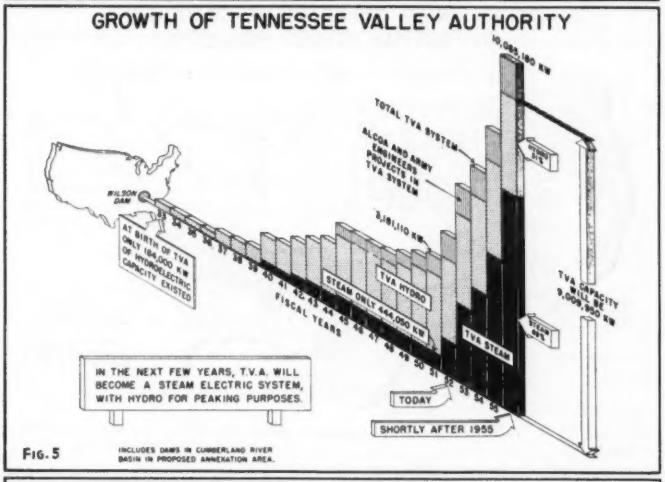
GROWTH OF TENNESSEE VALLEY AUTHORITY
TOTAL TVA SYSTEM
ALCOA AND ABOUT 9 ENGINEERS PROJECTS IN TVA SYSTEM
WILSON DAM
AT BIRTH OF TVA ONLY 184,000 KW OF HYDROELECTRIC CAPACITY EXISTED
3 BILLION KW
TVA HYDRO
STEAM ONLY 444,050 KW
TVA STEAM
FISCAL YEARS
TVA CAPACITY WILL BE 9,000,950 KW
IN THE NEXT FEW YEARS, T.V.A. WILL BECOME A STEAM ELECTRIC SYSTEM, WITH HYDRO FOR PEAKING PURPOSES.
TODAY
SHORTLY AFTER 1955

FIG. 5 INCLUDES DAMS IN CUMBERLAND RIVER BASIN IN PROPOSED ANNEXATION AREA.

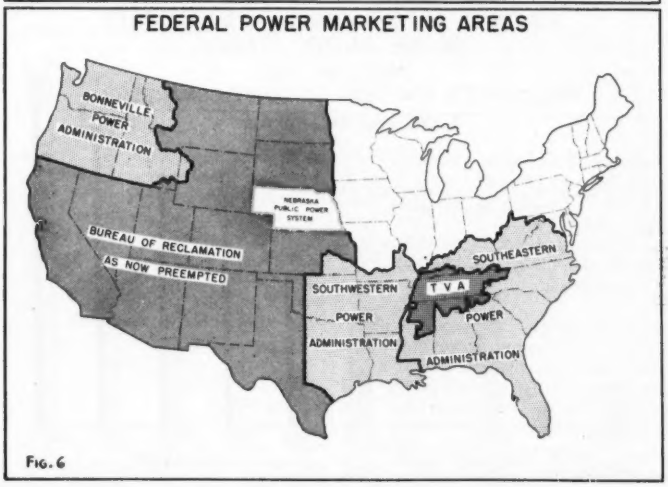

FIG. 6

ing established a complete monopoly in its area, free of state and local regulation and an integral part of the federal government. It is an excellent example of what could and will probably happen in other areas, although it may be accomplished under another name and a somewhat different looking setup. When TVA completes the work it now has under way, it will be a 10 million-kw system with a steam-electric base and hydro plants for peaking purposes. This is a far cry from the announced objectives when the authority was founded.

Fig. 5 illustrates the very rapid growth that has taken place and is forecast for the immediate future for the TVA. The authority is also planning expansion of its service area. It is taking over the output of the Army Engineers' dams in the Cumberland Valley. A bill was introduced in the 82nd Congress which would have formally annexed the entire Cumberland Valley to TVA. The bill was not acted upon, however. While the passage of the bill would have enabled TVA to build hydro plants on the Cumberland River, it is accomplishing the same result through the Army Engineers. Much of the Cumberland Valley is already in the TVA service area.

Money has been allotted by Rural Electrification Administration to the East Kentucky Rural Electric Cooperative, which will be an $88 million super-co-op system. It seems probable that TVA will in some manner include this super-co-op in its orbit, and thus will advance its service area northward to the outskirts of Cincinnati, Ohio.

TVA is also an excellent example of the marketing methods being used by all the federal agencies. The federal government controls the situation by owning and operating the major power facilities, and to a growing extent, the basic transmission. Local political bodies and co-ops do the major distributing, and as a rule are held captive by restrictive contracts and loan agreements.

Fig. 6 shows how the federal government has been set up to handle its power business. Bonneville Power Administration and TVA are the results of acts of Congress. Southwestern Power Administration and Southeastern Power Administration were set up by edict of the Secretary of the Interior. The Bureau of Reclamation has pre-empted the area it now serves. As new federal power plants are completed, new power administrations can be expected.

The federal electric power empire through its various branches asked for

The Federal Power Empire

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a net of $1,037,000,000 for appropriations in 1952 for projects apparently involving electric power. The table on p 79 gives details.

In the last-minute confusion as the Congress rushed to adjourn these requests were modified. It is believed that the federal projects involving power facilities actually obtained about $934 million for construction purposes, which apparently is $103 million less than the net amount requested.

In considering figures such as these, one should remember that accounting accuracy is not possible due to the confused manner in which the government data are made public. However, the totals shown probably are quite close to what the precise figures would be if they could be ascertained.

When the 1953 appropriations are included, the total spent by the federal government in constructing projects involving power exceeds $8 billion. Fig. 7 shows the estimated breakdown of this vast sum.

The spending of money on a lavish scale has always been an essential part of the federal power program. The general distribution of this spending, exclusive of REA, is shown by Fig. 8. In addition to the amounts shown, other large sums have been spent on facilities not involving power. This is especially true in the arid West, where extensive structures have been built exclusively for irrigation.

The federal power empire is showing great interest in the construction of steam-electric stations and in the purchase of steam-electric energy from electric companies. This is of major importance. TVA has long had steam-electric stations. In the Pacific Northwest, Interior attempted to secure authorization to build steam-electric stations to firm up its hydro plants in the area, and claims to have authorization for a steam plant in Central Valley, but has not yet obtained money for it. In other sections the endeavor is to purchase off-peak steam-electric energy for the purpose of "firming up" low load factor hydro stations.

The objectives of this policy seem obvious. First, the amount of firm power and energy available for sale by the federal utility would be greatly

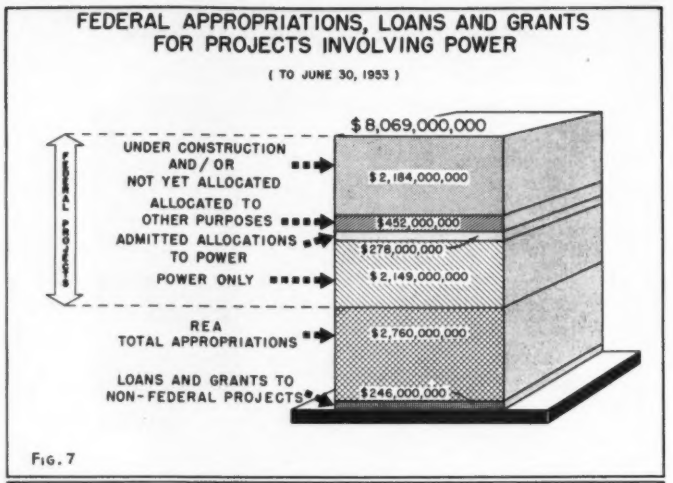


FIG. 7

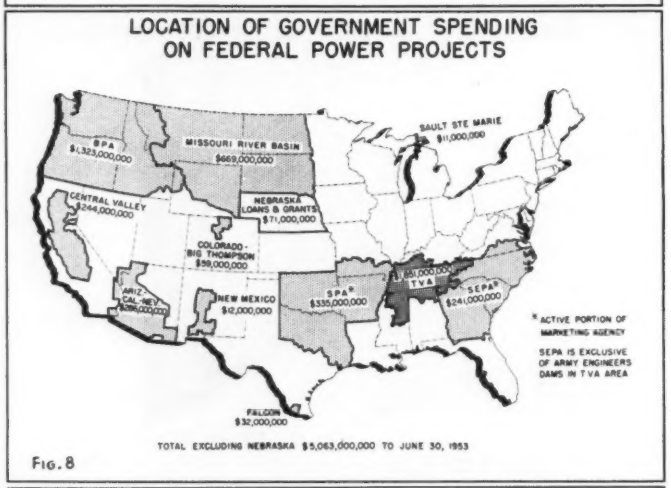


FIG. 8

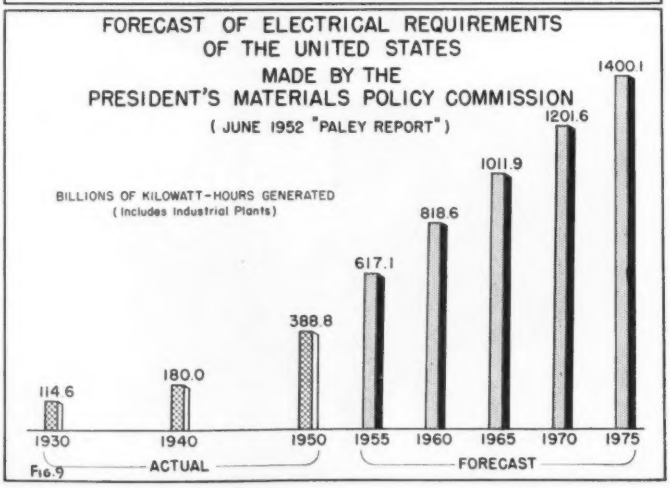


FIG. 9

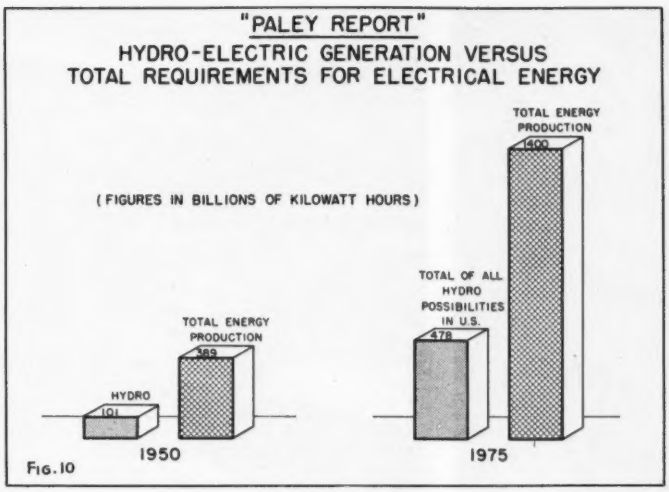


FIG. 10

Distribution of Federal Power Program as of 1952

Area	Kw	%
New England, New York and Pennsylvania	5,400,000	7.91
Pacific Northwest	22,400,000	32.85
Pacific Southwest	11,000,000	16.13
Missouri Basin	12,000,000	17.60
Southwest Power Administration	2,600,000	3.81
Southeast Power Administration	4,800,000	7.04
TVA and Service Area	10,000,000*	14.66
Total	68,200,000	100.00

*Includes 1,100,000 of Army Engineer projects in the TVA area

Appropriation Requests in 1952

	Construction Funds
Regular budget for fiscal year 1953	$ 901,000,000
1952 supplemental appropriation	150,000,000
Total	$1,051,000,000
Amount in regular budget not allowed but granted in supplemental appropriation	14,000,000
Net request	$1,037,000,000

enlarged, especially where sales to "preference" customers are the main business of the marketing agency. Secondly, it would prevent a limitation on the size of federal power operations. If federal power is to be confined to hydroelectric development then, except in the Pacific Northwest, a very definite limitation would be placed on the scope of federal operations in the power business.

While the first objective is of immediate concern in the long run, the second is of much greater importance. The TVA experience has shown how quickly an area can outgrow its hydroelectric resources. The recent report of the President's Materials Policy Commission (Paley Report) gives a further clue as to the importance to the federal power empire of making sure, either by law or pre-emption, of the right to build and operate steam-electric stations and to buy power for resale.

Fig. 9 shows the forecast of electrical requirements contained in the report. It shows that the nation will need 1.4 trillion kwh by 1975. A review of the data indicates that a determination of the 1975 energy requirements was made based on anticipated population and use by households, farms, commercial establishments, industries and government bodies. The intermediate points are on a straight line between 1950 and 1975, and evidently have not been developed separately.

Fig. 10 shows the relation between hydroelectric generation and total generation for the nation. The figures for 1950 are those appearing in the Paley Report (they do not check precisely with EEI data). The total energy production for 1975 is the 1 trillion 400 billion kwh forecast for that year. The hydro production of 478 billion kwh also is taken from the report, and includes all of the hydro potential in the country, existing and prospective, public and private, and even the sites that will cost so much as to be prohibitive for economical development. Yet if it were all in service in 1975, the hydro could furnish only one-third of the needs of the nation.

Obviously if the federal government is to be limited to hydroelectric development, its scope in the electric utility business will also be limited.

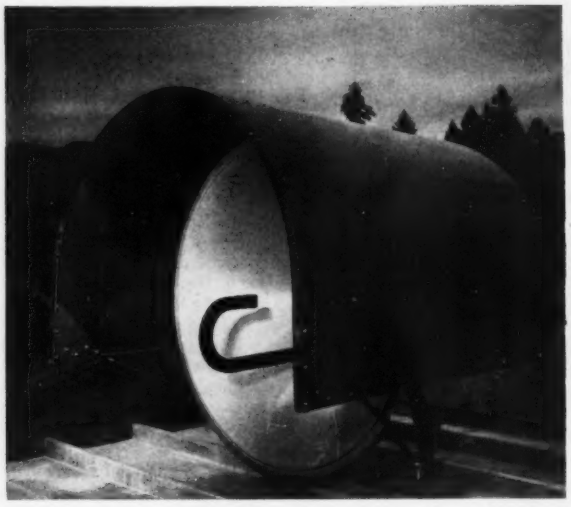
Future Plans

It seems evident that the future plans of the federal power empire are to:

1. Get all the money it can from the Congress to build and build and build.
2. Avoid any out-and-out test of its right to do as it is, or any clear-cut outline of policy set by the Congress.
3. Prime up its hydro stations by purchasing power from utilities, municipalities and co-ops.
4. Secure by default the right to build steam-electric stations and hydro plants solely for power.
5. Strengthen and expand its marketing agencies.
6. Encourage the formation of preference customers.
7. Step up the use of propaganda.
8. Call for more and more flood control, irrigation and navigation to afford additional opportunities for electric power.
9. Fight to keep all its special privileges, especially freedom from taxation.

The federal power empire today is a well-organized, going concern. It has considerable backing and has been well sold to the general public as greatly in the public interest. As it exists today, it cannot stand still. It is certain to attempt to advance its interests and enlarge its scope with all its considerable powers.

As federal power lacks a firm foundation of integrity and economics, it is vulnerable to the truth about its purposes, operations and effect on the taxpayers. Let everybody in the electrical industry know and tell the truth.



Mounted on a hilltop this passive reflector at right and parabolic reflector at left above are part of 12-mile link in . . .

Microwave Remote Control for Yale Plant

E. Robert de Luccia

Vice-President and Chief Engineer
Pacific Power & Light Co.
Portland, Ore.

When Yale hydroelectric project, the Pacific Northwest's newest power plant, goes into operation this month it will mark the successful conclusion of a dramatic race against time with partial alleviation of a tight regional power situation as the stakes. The first 54,000-kw unit of the $30 million project built by Pacific Power & Light Co. on the Lewis River of southwestern Washington was scheduled to start turning over during November. The second unit of the same size, fulfilling the initial development planned by Pacific at the Yale site, is to go on the line in December.

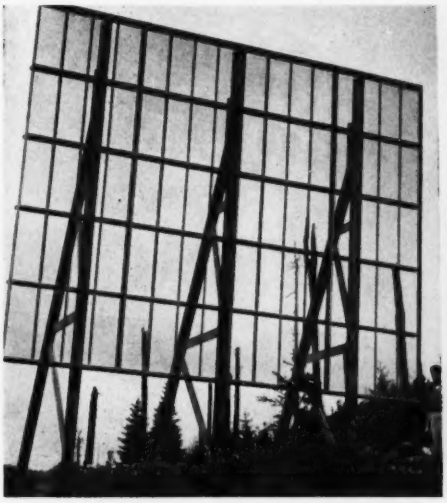
Significance of the new plant to the region extends considerably beyond mere size, although its estimated annual output of 550,000,000 kwh will be a welcome addition to the resources of the Northwest Power Pool. It is significant also because of its construction by private enterprise in the face of recent domination of the power-generation field in the region by large federal developments on the main stem of the Columbia River. Stream flow characteristics of the Lewis, with its seasonal peak runoff occurring during the winter when demand is high and at the time the Columbia is at its lowest stages, gives the plant added significance.

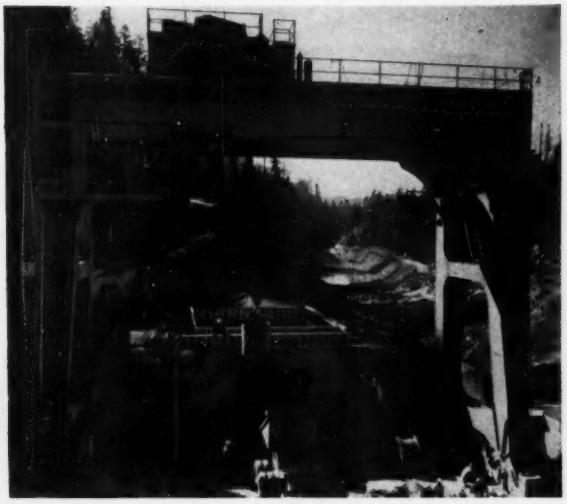
Microwave Supervisory Control

While Yale is a relatively conventional example of earth-fill dam and semioutdoor power house, the program calling for operation of a plant of its size largely by microwave control gives it some unusual features. Pacific Power's operating program for the new plant will make it a semiautomatic station controlled from its companion Merwin hydro project, with 100,000-kw plant 12 miles downstream on the Lewis. Under this program Yale's units will be put on the line manually by the operator-oiler on duty. The Merwin operator through supervisory equipment and the microwave communications system then will take over control of the kilowatt and reactive loading of the machines.

Working ahead of schedule crew is shown installing last of five taintor gates on Yale spillway and completing biggest riveting job

The microwave system also will telemeter the loading of each of the Yale generators and the Yale-Merwin transmission line, as well as other essential information for remote operation of the plant. It will extend to the Yale power house as well the load-frequency control now in use on the Pacific system between Portland and the Merwin plant. This will permit any combination of generators at the companion Lewis River plants to be tied together for control of frequency for the Northwest Power Pool whenever that responsibility is given these plants. Another channel on the microwaves





Passive microwave reflector is 20x24 ft made from punched sheet. At right, the loads are talked into place with Yale's massive crane

will carry a transfer tripping system for protection of Yale's main transformer bank, including a provision for blocking out the automatic reclosure on the breakers located at Merwin.

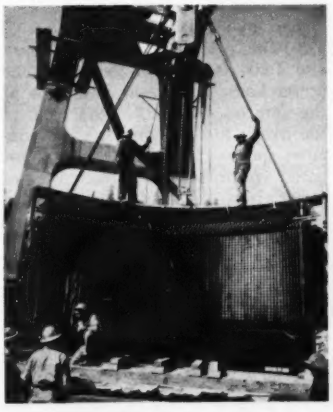
A number of telephone functions also will be provided by the microwave system, including voice communication between Yale, Merwin and the company's Portland headquarters. In addition it will supply a communications link to the outside for the operators resident at the Yale plant, located in an area lacking commercial service.

Because of the mountainous terrain in the Lewis River canyon, the microwave channel between the two plants is laid out in a two-part dog-leg. From the parabolic antenna at 362-ft elevation at Merwin, the wave is beamed sharply upward and nearly at right angles from its destination. It is aimed at a 20x24-ft passive reflector on a hilltop 1.36 air miles away. There it is reflected 11.09 miles at an angle of about 75° to the parabolic antenna on a hillside above the Yale power house at 637-ft elevation. The installation was made by Motorola and in its planning stages represented the largest hydro station for which such remote microwave control had been completed.

Construction Speed

Speed, dictated by the urgent need for new power capacity in the Pacific Northwest region, was the keynote throughout the construction of Yale, with the large main earth-fill dam completed in the amazingly short period of just over eight months. During that period more than 4,200,000 cu yd of material were placed. Making this feat all the more amazing was the fact that it was done in spite of approximately 120 in. of rainfall.

Preliminary work on the project began in March 1951. Engineering studies of the river made a quarter century earlier were brought up to date by Pacific engineers and Ebasco Services Inc., the latter having supervised design and engineering for the Merwin project brought into production in September 1951. Dirt began to fly in earnest in June with designation of the project as a defense plant and granting of a certificate for accelerated amortization. Morrison-Knudsen Co. Inc. was named principal contractor.

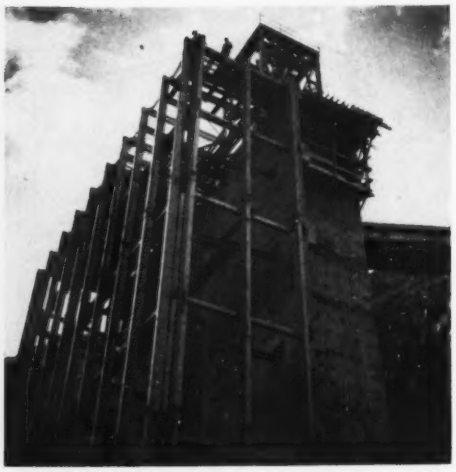


Completed section of stator is swung into place and bolted down in a few minutes with aid of crane having special motors, controls

First elements of the project to be completed included a secondary dam or dike closing a saddle between two knolls on the reservoir wall and the diversion tunnel. The secondary dam is approximately 1,500 ft long, 40 ft high and 300 ft wide at the base. Overburden removed from the main dam site was placed for much of this fill, adding to the efficiency of the operation and helping to keep costs in hand.

The 35-ft horseshoe diversion tunnel is driven through the right bank of the Lewis River, which at the dam site flows through a narrow inner canyon. Heavily fractured rock faced the tunnel crews through most of the 1,500-ft length of the large bore, requiring considerable timbering. After a cut and twin portal were opened up on the upstream end, the bulk of the driving was done from the downstream portal. Crews working around the clock averaged about 30 ft of heading per day in pushing the tunnel through. Electric muckers and muck trains hauled out the soil, much of it stockpiled near the portal for use in the downstream cofferdam. Diversion of the river was made Sept. 26, 1951, with completion of the upstream cofferdam.

Placing of fill on a bench on the north bank above the inner canyon, already cleared to bedrock, began even while the main channel was being cleared of overburden. And as soon as the main site was prepared a whole fleet of earth-moving equip-



General view of project showing rockfill dam, spillway and power house. St. Helens in background. Right: I-beam trashrack structure

ment was turned loose to place the huge main structure, one of the highest earth-fill structures. At the height of construction, more than 1,700 men were at work on the job, with a fleet of 65 diesel-engine trucks placing fill and removing spoil. These were all Euclid end-dump rigs of 10, 17 and 25 yard capacity. The eight power shovels and draglines kept them busy around the clock. At the peak work was on such a precision basis that trucks were dumping on the massive fill at the rate of one each 34 seconds. The record day's placement was achieved on June 17, 1952, with this massed equipment putting 40,312 cu yd on the dam.

Unforeseen Problems

Original design for a rock-filled structure was discarded when native rock at the area proved unsuitable. However, explorations in the reservoir area disclosed millions of yards of glacial deposit ranging in size from sand to cobbles twice as large as a man's head and highly suitable for the random-fill sections of the big structure. Other areas held pure sand for filter sections while silty clay material suitable for core occurred in other nearby parts of the project land. How to whip the problem of placing the silty clay core in spite of rain, often running more than an inch a day, was the headache-maker for the engineers.

Several proposals, ranging from huge tents to drying retorts, were examined and discarded. Meantime, pending a solution, clay pits and stockpiles were given a "raincoat" of asphalt to keep them dry against eventual use. But unceasing exploration and testing provided an entirely different answer that made it possible to keep the big project on the speed schedule necessary to have power flowing in time to help meet the 1952-53 peak.

Discovery of a deposit of material most perfectly graded in size from fine silt to 1-in. gravel proved the solution. Exhaustive tests showed it to be impervious. In fact, it could be worked in the wettest weather. The project laboratory and geologist consultants termed it a perfect wet weather core material. With this torrential impervious conglomerate forming the core section, construction of the dam proceeded at full speed throughout the winter.

The main dam is approximately 323 ft high, 1,500 ft long at the crest and 1,200 ft thick at the base. The power house is situated at the toe of the dam on the left (south) bank of the river. On the right bank is a concrete spillway with five steel taintor gates controlling the discharge of water into a 900-ft-long concrete chute that slopes downward to the river below the power house.

Water for the initial two units at Yale will be delivered to the turbines through twin tunnels 1,100 ft long and 21.5 ft in diameter driven through the left abutment. They have a maximum slope of 55° and presented a tough driving job for the M-K tunnel crews because of the character of the rock. Both are concrete lined throughout. The intake structure controlling flow into the power tunnels is 100 ft high to the deck. Impounding of water in the Yale reservoir began Aug. 1.

Future Plans

Completion of the Yale project will mark the second phase of Pacific Power & Light's program for step-by-step development of the power potential of the Lewis River. Exploration already is under way at two more sites upstream on the river, with test borings being made to determine feasibility of additional power plants. Applications for preliminary FPC permits propose a 50,000-kw installation at the Swift Creek site and 35,000 kw at Muddy River. The additional upstream storage also would be required to permit enlarging the Merwin plant to its ultimate capacity of 200,000 kw and Yale to an ultimate of 216,000 kw. Both plants are designed for such future expansion with penstocks installed in the arch-type concrete structure at Merwin. At Yale special preparation has been made to power third and fourth units by use of the diversion tunnel. In preparation for making a future tap into the tunnel downstream from the concrete plug a concrete silo 76 ft in diameter and 55 ft high has been constructed at the site of the future intake work to serve as a caisson or cofferdam. Within this, construction can be carried on by drawing down the reservoir to minimum operating level.

Completion of this program would give Pacific 510,000 kw installed on the Lewis, almost the equivalent of another Bonneville Dam.

Workmen install the third of four parabolic microwave reflectors high atop Mt. Wilson

Edison Company Adopts System-Wide Microwave

Kenneth E. Dueker
Engineer, Communication Division
Southern California Edison Co.

With the continuing expansion of the generating facilities of the Southern California Edison Co. and the corresponding increase of associated transmission, distribution and service systems, the Edison Communication Division has been called upon to provide communication circuits to points not previously served and additional circuits to expedite operation of existing installations.

The existing point-to-point communication circuits owned and operated by the company consist of open-wire lines, cable, telephone line carrier and power line carrier. These circuits connect all company properties, and are used for operation of the far-flung power system.

When two major items of communication plant expansion became necessary, N. L. Clarine, superintendent of communication, directed a study by his engineering staff of the practicability of accomplishing the expansion by the use of microwave equipment.

Need for the two major items of expansion arose as follows:

Construction of a new generating plant, the Etiwanda steam station at Etiwanda, San Bernardino County, made necessary the provision of communication circuits to this point from the load dispatcher's office in Alhambra, from the general office in Los Angeles, from substations and from other generating plants. Associated with this phase of the problem was the desirability of supplementing the existing circuits between the Alhambra communication center and company properties in and around San Bernardino because of increasing traffic.

The second item was the necessity for replacing circuits carried in cable between the Los Angeles general office and the district offices in Huntington Park. These circuits operate as stations on the automatic dial telephone exchange in the general office and are limited in number.

Microwave Considerations

Since the locations to be connected (see sketch) were not situated so that a line of sight path could be obtained with reasonable height antenna towers, it was necessary to plan on the use of repeater stations. The choice of repeater sites was made on the basis of providing the line of sight path required for microwave propagation, providing the shortest possible hops, accessibility and availability of electric power supply.

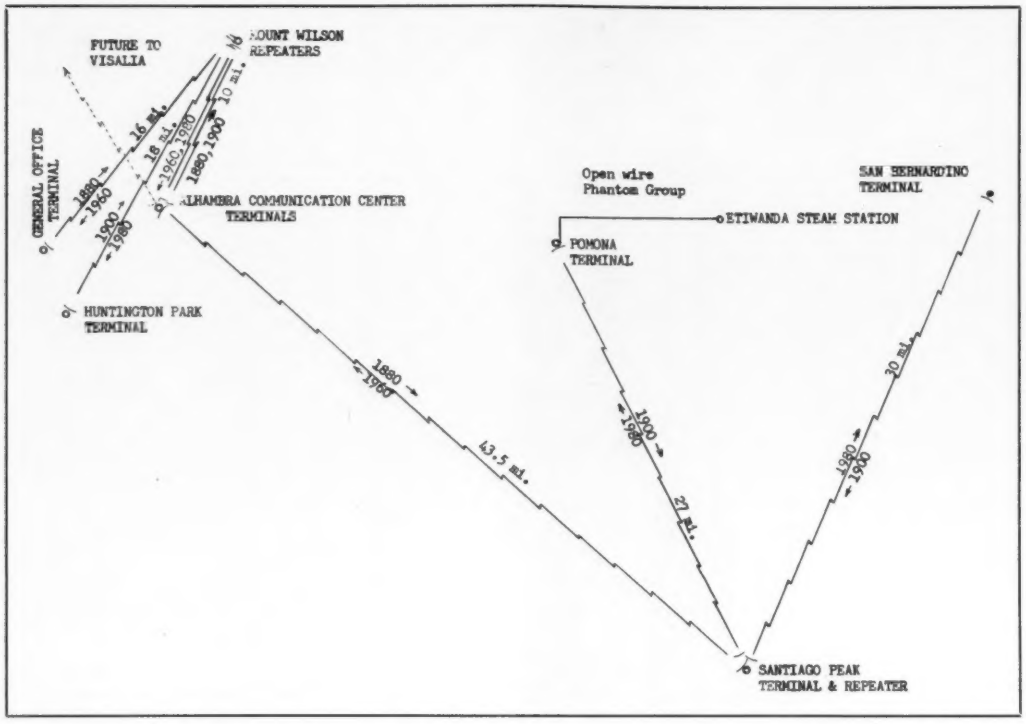
Profile drawings were made of each proposed hop using data obtained from topographic maps plotted on special coordinate sheets that accounted for the earth's curvature. Optical surveys of the selected paths were made where atmospheric conditions permitted. Finally tests were made during the months of November and December 1950 of the attenuation of each hop at microwave frequencies.

These tests were made under temporary authorization of the Federal Communication Commission. A frequency of 1,900 megacycles was used, the equipment consisting of a pulse modulated transmitter and a receiver whose output was measured by a recording meter. A 6-ft parabolic reflector was used with each of the antennas and 50 ft of RG 17U cable was used at each terminal. The gain of the antennas and the loss of the coaxial transmission line was used to correct the measured path attenuation for comparison with the calculated values of free space loss at the frequency and length of path considered.

After a study of results of the tests and in consideration of the communication system requirements, three microwave systems were proposed.

Three Systems

The first of these systems will utilize a terminal at the Alhambra communication center; a terminal and a re-



Southern California microwave system showing relative locations of terminals and repeaters and channel lengths and frequencies used

peater with drop and insert equipment atop Santiago Peak, in Orange County; and terminals at Pomona and at San Bernardino.

The terminal at Alhambra is wired for an ultimate capacity of 23 channels and originally equipped for eight channels. The terminals at Pomona and at San Bernardino are each wired for an ultimate of eight channels and equipped for three channels. This arrangement will provide three circuits between Alhambra and San Bernardino and three circuits between Alhambra and Pomona. These latter circuits are to be connected to the Etiwanda steam station by open-wire lines.

Provision has been made to receive certain items of alarm information from the Santiago Peak repeater at Alhambra. These data will indicate change-over to stand-by radio frequency equipment, transfer to stand-by power supply, etc. The use of the surplus channels for telemetering, tie line load control, relaying, and facsimile is planned. A maximum of 18 telegraph circuits can be applied in lieu of any one voice channel.

The second and third systems are integrated. One system consists of a terminal at Huntington Park, a repeater atop Mount Wilson, and a terminal at Alhambra. The terminals at Huntington Park and at Alhambra on this system are each wired and equipped for eight channels.

The third system consists of a terminal at Alhambra, a repeater atop Mount Wilson, and a terminal at the general office in Los Angeles. The terminal at the general office is wired and equipped for eight voice channels and the Alhambra terminal of this system is wired for an ultimate capacity of 23 channels but initially equipped for eight channels.

The interconnection of these two systems is to be made on a four-wire basis at Alhambra. It will provide five trunk circuits between Huntington Park and the general office; three circuits between Huntington Park and Alhambra; and three circuits between Alhambra and the general office.

An automatic exchange will be installed at Huntington Park and interchange dialing will be used over the five circuits so provided.

Use of a separate path, Huntington Park-Mt. Wilson-Alhambra and Alhambra-Mt. Wilson-general office permits limiting the equipment on Mt. Wilson to two RF repeaters with stand-by. It also makes all eight circuits available for use between Alhambra and the general office in the event that an emergency condition should require such rearrangement.

Microwave Adopted

The proposal for the installation of the three microwave systems described above was approved by management, and the necessary equipment ordered in February 1951. The RF equipment for terminals and repeaters, multiplex equipment, drop and insert equipment, terminating bays, stand-by equipment, and associated power supplies is manutured by Federal Telephone and Radio Corp. (its type 10 C, pulse time modulation, 1,900-megacycle equipment). Antenna assemblies and rigid coaxial transmission lines are manufactured by Product Development Co. Dialing equipment, automatic to automatic repeaters for the Alhambra, Huntington Park, and general office terminals, are manufactured by Automatic Electric Co. Antenna support structures have been designed and constructed by Edison forces.

Installation of the equipment will be made by Edison's communication

Field surveys and tests are important steps in laying out microwave channels to determine best locations for terminals and repeaters

division forces. Several men have been sent to the Federal plant for instruction in the installation of this equipment.

Construction permits have been issued by FCC for the stations comprising the three systems. A total of four frequencies in the 1,850 to 2,200 megacycle band has been assigned by the commission for use in these systems. Arrangement of paths and the combinations of frequencies to be used may be noted in the accompanying drawing.

At the present time the antenna installations have been made at all terminals and repeater locations. Photographs of several of the terminal and repeater locations show the type of antenna structures utilized. The number one system, connecting Alhambra, Pomona, and San Bernardino by way of the repeater station on Santiago Peak has been placed in operation.

The number two and number three systems are being readied and are expected to be in operation by the time of publication of this article.

Equipment is on order to expand the number one system to provide circuits to four major substations and the Etiwanda steam station. The manner in which this is to be accomplished and the engineering problems involved will be the subject of a later report.

Future Expansion

While the task of installing equipment for the system described is proceeding, the engineering staff of the Edison communication division is planning future extensions of microwave circuits from Alhambra communication center to the company's San Joaquin Valley division headquarters in Visalia, Tulare County, and to the Northern division hydro installations at Big Creek, Fresno County. This future system will supplement existing communication circuits now carried on open wire with telephone-type carrier superimposed on the physical circuits and on power line carrier on the 220-kv transmission lines. The circuits will be multipurpose as are the present three systems, with tie line load control, telemetering, and possibly fault locating equipment used in addition to the voice frequency dispatching and operation circuits.

Present studies of topography and field testing with microwave equipment indicate that the plans are feasible and sound from both an engineering and economic viewpoint.

Specifications for the equipment required for the microwave circuits between Alhambra and Visalia have been prepared and invitations for bids on these specifications will shortly be issued.

Data are being collected on the operating characteristics and economics of the microwave links installed to date, and it is anticipated that the Edison company's experience with this new medium will be shared through future articles on this subject.

Transformers May Carry More Load

Word comes from the East of a new process that is said to increase the heat-dissipating properties of transformer oil by ten times and increases the rating of transformers by several times. The method is simple in principle. The Kaehni brothers of Cleveland working over a period of seven years found that by establishing an electrostatic field between the coils of a transformer and the case the oil molecules become charged and circulate more rapidly.

A rectifier, either within or outside the transformer, takes a-c current from the line and sets up a d-c electrostatic charge of one polarity on the transformer coils and the opposite polarity on the case. Oil molecules near the coils receive a charge and are attracted then to the case, carrying heat with them to be dissipated through the transformer case.

This may be an oversimplification of the new development, but information so far received is only of a general nature. Many questions are left unanswered. For instance, how is insulation - to - ground maintained if one side of a rectifier is connected to the coils or a shield around the coils, and the other terminal connected to the case? The method is said to be equally applicable to line transformers and to power transformers, and nothing is said about voltage rating.

The process is being sponsored by Leon A. Beeghly through the Metal Carbides Corp. of Youngstown, Ohio, with the Kaehni brothers still retaining an interest. Engineers of public utility companies in Ohio are reported to be greatly interested in the new development.

Spending Dollars to Save Dimes

Free access materials plan for fast-moving, low-unit-cost items cuts stores accounting costs one-third for Sacramento utility

William J. Nolan

General Auditor
Sacramento Municipal Utility District
Sacramento, Calif.

Stock control and cost distribution work have been reduced one-third by a simple change in accounting made by the Sacramento Municipal Utility District. What has been called "the free access materials plan" was adopted about a year ago. This plan has been applied to fast-moving, low-unit-cost materials associated principally with pole line construction or maintenance work. The system has been in effect for a sufficient period to gage results which are satisfactory to date.

Miscellaneous minor materials used in utility distribution plant such as nuts, bolts, washers, etc., represent a considerable part of the total issue transactions from stores but only a small fraction of the total cost of all materials used. These are the items associated with almost every construction or maintenance work order and are repeatedly withdrawn from stores usually in quantities for a particular line extension or maintenance job.

Individual Treatment Costly

It is common utility accounting practice to give each withdrawal requisition dual treatment. In one operation each requisition, line by line, is posted to the perpetual inventory record for each stock code symbol as a reduction of the inventory quantity and cost balance. Again the requisition receives accounting treatment by charging the cost of material to a construction work order or maintenance expense account usually through the medium of a monthly material distribution register. The high degree of individual treatment accorded these minor items frequently results in the accounting costs exceeding the value of the material issued. In essence, the utility industry pays dearly for this precision and literally is spending dollars to account for dimes.

This high cost of accounting for fast-moving, low-unit-cost materials became particularly evident to us at the Sacramento Municipal Utility District when a study was made of the volume of transactions in these items. This survey indicated that nearly 50% of the issues from stores consisted of minor materials whereas they represented less than 5% of the total cost of the materials used. In the light of rising costs of operation and the difficulties in recruiting trained personnel, the continuance of the separate treatment given to each withdrawal of minor material could hardly be justified.

Upon analyzing the material cost distribution reports for several months, a very definite pattern was observed in the accounts normally charged with these items, which are largely those

Sacramento Municipal Utility District
Materials and Supplies Approved for Issue to Open Bin Stock

(Storeroom will use these accounts to replenish bins)

Stock Code No.	Description	Maintenance Account	Plant Account	W. O. No.
12-0005	Rock, Crushed 1 ¼		354.063	10112
14-8004	Pin, Wood Insulator 9		354.063	10112
17-6024	Tape, Plumbers ¾	10%—768.263	90%—355.063	10112
18-0005	Brace, Xarm 36		354.063	10112
18-0008	Brace, Xarm 28		354.063	10112
18-0010	Brace, Xarm 32		354.063	10112
18-0011	Brace, Xarm 36		354.063	10112
18-2056	Hook, Bolt LM1745		354.063	10112
18-6002	Clamp, 3 Bolt, 4	25%—768.163	75%—354.063	10112
18-6003	Clamp, 3 Bolt, 6		354.063	10112
18-6005	Clamp, 3 Bolt, 6 (PAX-2)			10112
18-6007	Clip, Guy ¼	25%—768.163	75%—354.063	10112
18-6015	Clip, Guy 5/16		354.063	10112
18-6016	Clip, Guy ⅜	20%—768.163	80%—354.063	10112
18-6017	Clip, Guy 7/16		354.063	10112
18-8067	Step, Pole ⅝x10		354.063	10112
19-2261	Bolt, Mach. ⅜x1 ½		354.063	10112
19-2268	Bolt, Mach. ⅜x4 ½		354.063	10112
19-2269	Bolt, Mach. ⅜x5		354.063	10112
19-2282	Bolt, Mach. ½x2		354.063	10112
19-2286	Bolt, Mach. ½x5		354.063	10112
19-2288	Bolt, Mach. ½x6		354.063	10112
19-2290	Bolt, Mach. ½x7	10%—768.163	90%—354.063	10112
19-2291	Bolt, Mach. ½x8	40%—768.163	60%—354.063	10112
19-2293	Bolt, Mach. ½x10		354.063	10112
19-2294	Bolt, Mach. ½x12		354.063	10112
19-2302	Bolt, Mach. ⅝x2	20%—768.163	80%—354.063	10112
19-2305	Bolt, Mach. ⅝x3 ½		354.063	10112
19-2308	Bolt, Mach. ⅝x5		354.063	10112
19-2310	Bolt, Mach. ⅝x6		354.063	10112
19-2313	Bolt, Mach. ⅝x8	25%—768-163	75%—354.063	10112
19-2315	Bolt, Mach. ⅝x10		354.063	10112
19-2317	Bolt, Mach. ⅝x12		354.063	10112
19-2319	Bolt, Mach. ⅝x14		354.063	10112
19-2321	Bolt, Mach. ⅝x16		354.063	10112
19-2323	Bolt, Mach. ⅝x18		354.063	10112
19-2324	Bolt, Mach. ⅝x20		354.063	10112
19-2326	Bolt, Mach. ⅝x22		354.063	10112
19-2327	Bolt, Mach. ⅝x24	20%—768.163	80%—354.063	10112
19-2328	Bolt, Mach. ⅝x26		354.063	10112
19-2329	Bolt, Mach. ⅝x28	90%—768.163	10%—354.063	10112
19-2337	Bolt, Mach. ¾x12		354.063	10112

plant and maintenance accounts related to pole line construction. From this observation of the normal cost distribution, we found we could eliminate the accounting of each issue transaction on the list of items appended to this article by the establishment of "the free access material plan" without sacrificing inventory control or factual cost accounting accuracy.

This Is How It Works

This is a simple plan and easy of adoption once the fast-moving, low-unit-cost materials and their normal accounting distribution are ascertained. The plan works as follows:

1. Packaged lots of the selected materials are held in regular stores inventory and are subject to normal requisitioning procedure.

2. The storekeeper establishes a working supply for each listed item by issuance of a regular requisition against the packaged lot stock. For each replenishment of the working supply, the storekeeper again issues the normal form of requisition.

3. The requisitions establishing or replenishing the working supply are charged to a blanket work order which is cleared at the end of each month to plant and maintenance accounts based on the study of distribution of charges previously mentioned. (The appended list of free access materials shows the accounting normally applied to each item.)

4. Operating personnel obtain their daily requirements of these materials by presentation of a memorandum preprinted requisition to the storekeeper which is filled from the working supply. This memo requisition does not receive accounting treatment and acts only as a storekeeper's authorization to deliver material.

When this plan was first introduced the memorandum requisition referred to above was a separate form. By the use of two requisition forms, one for the larger material and the other for free access items, the stores department experienced some difficulty in associating the two types of materials by work orders. Since minor materials are invariably requisitioned with larger items, one of our employees made the suggestion that the memorandum requisition could easily be incorporated with our regular withdrawal requisition as a way of solving this problem, further simplifying the paper work and reducing form costs.

On the occasion of a recent printing reorder for our standard withdrawal requisition, we adopted the employee's suggestion by printing on the reverse side of the original only, in tumble head position, a list of the most frequently used free access items. As it presently works, the field clerk writes up his order for regular materials on the face side of the requisition and then makes a half fold of the original (number one copy) writing in only the quantity required of the free access materials listed. In the event the free access material required is not listed, the requisitioner then writes in the article and quantity required. Since using the consolidated requisition form, the stores department problem has been solved and line truck loading time has been reduced because all related materials are now assembled and boxed by job at one point.

The face side of the requisition receives normal accounting for inventory and cost distribution purposes. On the other hand, no accounting is made of the withdrawal of free access materials as shown on the reverse side of the requisition since these items were previously accounted when moved in packaged lots from regular stock to the free access bins.

Accounting Is Reduced

In summary, the accounting under the free access material plan is reduced from dual posting of each withdrawal by job to the number of times the working supply is replenished from the packaged lot stock. Prior to the adoption of this procedure in July 1951, we handled between 5,500 and 6,000 transactions monthly of the materials shown in the appended list, but subsequently the monthly volume has never exceeded 100 transfers to the working supply.

Actual operation of the plan has brought out a further saving of time. Our valuation division, in the development of units of property, was required to scan each item on each material

Sacramento Municipal Utility District
Materials and Supplies Approved for Issue to Open Bin Stock

(Storeroom will use these accounts to replenish bins)

Stock Code No.	Description	Maintenance Account	Plant Account	W. O. No.
19-2339	Bolt, Mach. ¾x14		354.063	10112
19-2341	Bolt, Mach. ¾x16		354.063	10112
19-2351	Bolt, Space ⅝x18		354.063	10112
19-2352	Bolt, Space ⅝x20	10%—768.163	90%—354.063	10112
19-2353	Bolt, Space ⅝x22	10%—768.163	90%—354.063	10112
19-2354	Bolt, Space ⅝x24	10%—768.163	90%—354.063	10112
19-2355	Bolt, Space ⅝x26	60%—768.163	40%—354.063	10112
19-2356	Bolt, Space ⅝x28	60%—768.163	40%—354.063	10112
19-5058	Nut, ⅜ Square	768.163		10112
19-5059	Nut, ½ Square	768.163		10112
19-5065	Nut, Washer ⅜		354.063	10112
19-5066	Nut, ⅜ Mach. Bolt	20%—768.163	80%—354.063	10112
19-5067	Nut, Washer ⅝		354.063	10112
19-5068	Nut, Washer ¾		354.063	10112
19-5073	Nut, Lock ⅜		354.063	10112
19-5074	Nut, Lock ½		354.063	10112
19-5075	Nut, Lock ⅝		354.063	10112
19-5076	Nut, Lock ¾	50%—768.163	50%—354.063	10112
19-5245	Washer, ⅝ Bolt	10%—768.163	90%—354.063	10112
19-5272	Washer, Round ⅝	Use separate requisition to replenish bins	40%—354.063 60%—359.163	10112 10102
19-5273	Washer, Round ½	10%—768.163	90%—354.063	10112
19-5274	Washer, Round ⅝	10%—768.163	90%—354.063	10112
19-5286	Washer, Square 2¼		354.063	10112
19-5291	Washer, Square 4		354.063	10112
19-5293	Washer, Square 3¼	10%—768.263	90%—354.063	10112
19-5297	Washer, Sq. Curved 3		354.063	10112
19-5298	Washer, Sq. Curved 4		354.063	10112
19-5306	Eye Bolt 1741G		354.063	10112
19-6022	Screws, Lag ¼x2	10%—768.263	90%—355.063	10112
19-6031	Screws, Lag ½x4		354.063	10112
19-6034	Screws, Lag ½x6	25%—768.163	75%—354.063	10112
19-6039	Screw, Lag ⅝x5		354.063	10112
19-7073	Staples, Copperweld 3	10%—768.263	90%—355.063	10112
19-7121	Nails, Year		354.063	10112
33-6131	Fusestat, 15A	762.263		
33-6132	Fusestat, 20A	762.263		
33-6134	Fusestat, 30A	762.263		
33-6136	Fusetron, 15A	762.263		
33-6137	Fusetron, 20A	762.263		
33-6138	Fusetron, 30A	762.263		

Sacramento Municipal Utility District
Requisition Form Used in Applying Free Access Material Plan

SACRAMENTO MUNICIPAL UTILITY DISTRICT
REQUISITION and PURCHASE REQUEST
☐ Purchase ☐ Weekly Office Supplies

Service installed in connection with W.O. ____

Plant Unit(s) installed . . . . . ☐
Minor Item(s) inst'd as part of exist'g Plant Unit ☐

ANCHORS, POLES, CROSSARMS, HARDWARE	350043	768143
185010	8" 4way	
185014	10" 4way	
185050	⅜ x6' Rod	
185065	¾ x9' Rod	
185067	1"x10' Rod	
140535	F.T. 35'	
140540	F.T. 40'	
140545	F.T. 45'	
146008	7 S	
146012	8 LW	
146020	10 S	
180003	Brace 60° U	
191060	Eye Bolt ⅝x6	
149042	Bolt Cover Large	
181119	Steel Pin 5/8 " 1" Top	
181006	Single Pin Bracket	
373038	HiVolt Sign	
GUY MATERIAL		
101010	Com. Cable ¼"	
101014	HS Cable 5/16"	
315005	Insul. 504	
195307	Bolt Eye P126B	
186076	Hook P-135	
149024	Wood Guy Guard	

SERVICE ORDER		350043	768143	771143
291032	WP Alum. 4			
291053	" 2			
291055	Alum.Cable			
291014	WP Copper Cable 6			
	INSULATORS			
315003	Strain Small (500)			
316007	House Knob			
384006	Fric. Tape			
	CONNECTORS			
305006	Copper Serv. 6			
305002	Alum Serv 4			
305236	ACSR 4			
305237	" 2			
305229	Alum. 1/0			

GROUNDING MATERIAL		350043	768143
187002	Clamp Grd Rd		
187006	Copperweld Rod 8'		
149005	Hw. Mldg 1		
149007	Redw. Mldg. 3¼"		

Number of Guys: Overhead ____ Down ____

OVERHEAD CONDUCTORS AND DEVICES		350043	768143
290078	ACSR Bare 6		
290079	" 4		
290072	BCSD Wire 6		
291016	WP Wire 6		
290033	BC Cable 4		
291005	WP Cable ⅛		
291003	WP Cable 2		
291002	WP Cable 4		
291032	WP Alum. 4		
291053	" 2		
291055	" 1/0		
290050	Alum. Tie Wire 6		
384006	Fric. Tape		
	INSULATORS		
310002	4 KV Side Gr.		
310005	4 KV Top Gr.		
310006	12 KV Norm.		
	DEADENDS		
184065	ACSR Loop Clamp 4 & 6		
184061	ACSR Strain Clamp 2, 4, 6		
314014	7½" Susp Ins (4 KV Insul. Circuit)		
315001			
315002	Sec. Insul. Circuit		
315015	Sec. Rack (Set)		
305121	Bo Nice Offset		
305127	Bo Nice Susp.		

OVERHEAD CONDUCTORS AND DEVICES		350043	768143
	SPLICING SLEEVES		
305109	Sel. Copper 6		
305115	ACSR 6		
305117	ACSR 4		
305028	CONNECTORS Compsn. 6		
305032	Split Bolt ⅜		
305031	Split Bolt 2		
305236	ACSR 4, 6		
305237	ACSR 2		
305229	Alum. 1/0		
305319	Tap Clamp Copper 2/0		
305321	Tap Clamp ACSR 2		
325039	Pipe, Tube Sgt 6 or 8		
188082	S.A. Armor Rod #6		
188087	S.A. Armor Rod #8		
	LINE CUTOUTS & FUSES		
330032	Enclosed 50 Amp. 5KV		
330017	Open 25 Amp. 12 KV		
	Amp Univ.		
	Flip Open		
	TRANSFORMER CUTOUTS AND FUSES	350043	770043
	Amp Univ.		
	Flip Open		
330032	Enclosed 50 Amp. 5KV		
330017	Open 25 Amp. 12 KV		

Code No.	Vehicle On Hand	DESCRIPTION	Quant.	Unit	Account	List Price	Disc.	Net Price	Purch. Order	$ Amt.

Describe Job if other than Line Division
State Reason for Purchase

Job No. ____

LOCATION
☐ Various

Prepared ____ Date ____ By ____ Dept. (Omit if Operating) ____ Foreman ____

Adm. Approval on Purchases

Rec'd from Stores ____ Date ____ By ____

D 20332
ORIGINAL

P-3 ⑥ c-2250

NON-ACCOUNTABLE HARDWARE

	Quant.		Quant.		Quant.		Quant.		Quant.		Quant.		Quant.
Braces		Mach. Bolts		Mach. Bolts		Eyebolt (Not @ Hook, Bolt Ltd. @1745		Lag Screws		Clamps		Nuts	
X Arm 28"		½ x 12		⅝ x 24				½ x 4		U Bolt 6"		⅜ Mach. Bolt	
X Arm 32"		⅝ x 2		⅝ x 26		Washers		½ x 6		Guy Clips		Washer ⅝	
X Arm 36"		⅝ x 3½		⅝ x 28		⅝" Bolt		⅝ x 8		⅛		Washer ¾	
Mach. Bolts		⅝ x 5		¾ x 12		Round ⅜				5/16		Lock ⅜	
⅜ x 1½		⅝ x 6		¾ x 14		Round ½		Wood Pin Insul. 9"		⅜		Lock ½	
⅜ x 4½		½ x 8		⅞ x 16		Round ⅝				7/16		Lock ⅝	
⅜ x 5		⅝ x 10		Spuce Bolts		Square 2½		Pole Step ½ x 10				Lock ¾	
½ x 2		½ x 12		⅝ x 18		Square 3½				Copper Staples		Fusest. 15A	
½ x 5		½ x 14		⅝ x 20		Square 4		Yoar Nail		Plumb. Tape		" 20A	
½ x 6		½ x 16		⅝ x 22		P143				Nuts		" 30A	
½ x 7		½ x 18		⅝ x 24		P144		Clamps		⅜ Square		Fusstr. 15A	
½ x 8		½ x 20		⅝ x 26		Lag Screws		3 Bolt 4"		½ Square		" 20A	
½ x 10		½ x 22		⅝ x 29		¼ x 2		3 Bolt 6"		Washer ⅜		" 30A	

Field clerk writes up his order for regular materials on the face side of this consolidated requisition form, then makes a half fold of the original or number one copy, writing in only the quantity required of the free access materials listed. For items not listed the requisitioner writes in the article and quantity required. Face of requisition receives normal accounting but no accounting is made of the withdrawal of free access materials

requisition related to the construction of new plant. The marked reduction in items has proportionately reduced their handling time.

Exceptions will apply from time to time in almost any procedure and when possible, advance provision should be made to allow for simple handling of these cases. Occasionally materials on the free access list will be used for other than pole line construction or maintenance such as in the underground system, in the transportation department, or other function. When such instance arises, the withdrawal is accomplished through standard requisition procedure and cost distribution is made to the specific project. If the withdrawal is for less than a standard package, the material is supplied from the free access working stock and the requisition is temporarily held by the storekeeper pending the next replenishment of the working supply. At that time the requisition is used as a part of that replenishment in order to maintain the practice of withdrawal from regular stores inventory in standard package lots.

Periodic revision of the basis of distribution to the plant and operating expense accounts will be necessary as the emphasis changes from construction to maintenance or vice versa. Such revision reduces to practically nil the possibility of unrecorded assets at any particular time. By semiannual analysis of the memorandum withdrawal requisitions, mentioned in item 4 above, the percentages of distribution are revised to reflect any significant change in the use of this material.

The plan has worked so successfully for more than a year that it has been decided to expand the free access list of materials by adding small split bolt connectors, commonly used on overhead lines, and transformer kickers or clearance brackets. We are now in process of determining the pattern of cost distribution of prior issues and this will be used for clearance of the blanket work order in the manner previously indicated. We feel there is a vast number of items worthy of consideration for this plan but prefer to conservatively expand the free access list only after thorough study of the movement of items under scrutiny.

In closing, it might be well to state that we had originally placed a ceiling on the value of items considered for the free access list. Volume of traffic and low cost were the predominating qualifications for admission to the free access list but, because of the tremendous price fluctuations of recent years, volume may well receive the greater future emphasis and cost the lesser.

New G-E air-to-air residential package unit goes on trial in utility conducted . . .

Salt Lake Heat Pump Test

In an effort to develop further information on residential heat pumps, W. A. Huckins, manager, business development department, Utah Power & Light Co., Salt Lake City, is trying out another heat pump, this time one of the new General Electric package air-to-air units. Huckins previously had a heat pump of another type that used water circulated through a closed system in the earth, as the source of heat.

The accompanying photograph shows Huckins pointing out various features of the new G-E unit. This is one of the first of these machines to be installed in the West and the utility expects to develop important test data that will be of value to it as well as to its customers.

Description of Unit

The heat pump has a 5-hp, 230-v, single-phase compressor motor and two smaller motors driving fans. One is a ¾-hp motor and the other ½ hp. Total current rating of the unit is 30.5 amp. Change from the heating to the cooling cycle and vice versa takes place automatically and is determined by the outside temperature and the setting of the room thermostat. With this control arrangement the unit may operate part of a day on the cooling cycle and part on the heating cycle.

Automatically controlled dampers in the air-intake and exhaust ducts are so actuated that part of the air is recirculated to reduce the load on the heat pump, at the same time providing an ample fresh-air supply. Intake and exhaust grills on the outside of the house are separated by about 20 ft to prevent recirculation of air on the outside.

One of the most interesting features of this installation is a provision to cut in increments of resistance space heating up to 10 kw automatically when the outside temperature falls to 17° or below. Weather records for Salt Lake City show that out of the average 5,555 degree-day year, there are approximately 274 hours when the temperature is 17° or lower. The 10 kw of auxiliary heat is in three blocks, one of 2 kw and two of 4 kw each. These are located directly in the main air duct leading to the rooms. Each heater is controlled by its own thermostat, so that increments of booster heating are cut in as the outside air temperature falls.

The Huckins' residence is a six-room brick house, insulated and weather stripped, of 10,350 cu ft, with calculated heat loss of 75,000 Btu per hour with outside temperature of 0° and 72° inside. From this it was determined that 1,740,000 Btu of supplemental heat, the equivalent of 508 kwh, would be required for the 274 hours when ambient is 17° or lower.

Metering Setup

The metering arrangement is such that there is a master meter for the entire house, a submeter on the heat pump as a whole, and a sub to that meter for the auxiliary heating only. Each meter has a demand attachment so that complete data will be available on all components of the total load. Complete information on air temperatures at several points will be available from recording instruments.

Other Heat Sources Discarded

Resistance electric heat was chosen over two alternate sources to supplement output of the heat pump. City water would have been practical but was discarded because it would not have had widespread application and would not be a fair criterion of air-to-air operation. The other alternate was utilization of heat stored in disodium phosphate dodecahydrate packs. This was considered uneconomical and impractical because of space requirements.

Previous Test

The previous test referred to was made with a water-to-air heat pump consisting of two 3-hp units operating on two wells with total depth of 500 ft on the Huckins' property. Operation was not entirely successful because of pipe leaks below ground, corrosion and sweating of the water pipes, and mechanical troubles with the unit. Nevertheless, much valuable data were obtained.

Installation of the air-to-air G-E unit was made in August of this year so that some test information was obtained on the cooling cycle. Highest demand recorded for the entire house, which included range, water heater and other major appliances, besides lighting, television and small appliances in addition to the heat pump, was 9 kw.

Complete test data will be made available after a year's operation, with perhaps interim results on this winter's run on the heating cycle.

Step 1 Electricians John Fratis and Roy Strawn of Stein Electric Co., Sacramento, first adjust channel position, after fastening ceiling channel package to supporting brackets on ceiling. Licensed Installer C. T. Bakeman checks blue print details

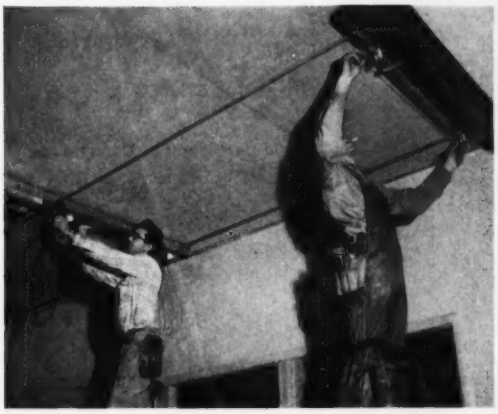
Step 2 The ceiling channel package, covering up to an area of 9x16 ft, has been opened and one half folded out to its receiving brackets at one end. The other half awaits raising to its position. Ceiling air duct is seen in upper part of picture

Six Steps to a Luminous Ceiling

It is neither hard nor expensive to install when it is an engineered and packaged, fold-out unit

Step 5 Completing installation of the wall angles. Then the acoustical baffles, which also help support the plastic, are hung from the channel system by adjustable rods fitted into the saddles seen around the lamp sockets in the picture above

Step 6 The acrylic plastic sections are then put in, supported by the acoustical channels and wall angles and lap one-half cycle to close. Installer Bakeman makes final check. (The shadow comes from the photographer's flash below ceiling)



Step 3 Spacer tubes are locked in position to assure lamp fitting and sockets are checked for position. Lamps at right angles to channels permit maximum spacing even with close lamp centers. Levels may be doubled by adding more sockets

Step 4 Connection of the prewired channel assembly to the supply circuit has been completed and lamps are then inserted. Wall angles to support the plastic along the wall are then installed, as partially shown here, to chalk-line levels on walls

Contrary to many opinions the installation of a luminous ceiling is neither complicated nor costly. A new and simplified method is built into the system that was put in at the Sacramento Utility District service building lobby by Stein Electric Co. of Sacramento and engineered by Earl M. Holm, SMUD supervising engineer.

Use was made of the factory engineered and standard packaged luminous ceiling of the F. W. Wakefield Brass Co. Realizing that one of the problems in the new field of integrated luminous ceilings was the unpredictable and usually high installation cost, that company developed a simplified procedure that utilizes maximum factory assembly. With a licensed installer field operation, all elements are tied together with the electrical system. This means that one trade, the electrical, makes the complete installation.

Conventional building construction often averages on-the-job labor cost of about 50% of the total installed cost. A large proportion of this is in the relatively unpredictable finishing stages. By using a prefactory assembly in engineered and supervised steps of installation as illustrated here, these ceilings have been done with installation labor of from 10 to 15% of installed cost. Labor costs, not including supervision of the job, ran approximately 7% on the SMUD installation, with two men working slightly over two full days on the job.

This luminous ceilng provides a three-way sky. It incorporates illumination, acoustical control and air distribution in one package. The finished ceiling also gives a pleasing architectural treatment to the room, a sense of unlimited sky of soft illumination above.

Air distribution is through the multitude of small holes in the acoustical baffles. This provides a completely diffused and draftless distribution without the need for branch ducts and distribution grills. Air change potential is higher than with conventional methods with lower duct pressures even in low ceilinged areas. Filtered air that enters the lobby area through the ceiling has an added function in the district's installation. The slight pressure and positive air flow prevents infiltration of outside dusty air into the plenum above the plastic even though outside doors are frequently opened.

Tests have shown that even in an installation in which the air is not brought in through the ceiling in this manner the dirt accumulation is greater on the under side than the upper side of the plastic. These acrylic plastic panels are of a size to make them easily removable for cleaning. They have a low affinity for dust and in tests satisfactory occasional washing "off the ladder" can be accomplished for as little or less than normal periodic repainting of conventional ceilings.

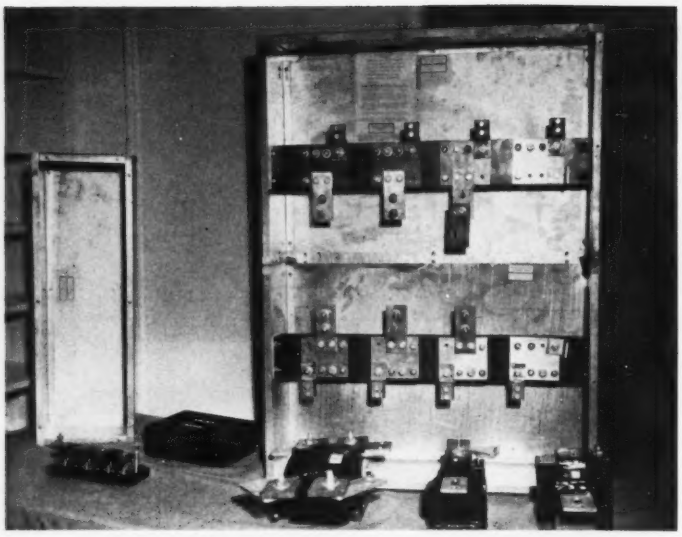
By using a high reflectance white ceiling paint in the area above the plastic, lighting utilization runs about 80 to 90% of that obtained by bare tubes on the ceiling. Maintenance factors have been found to be comparable with conventional lighting systems.

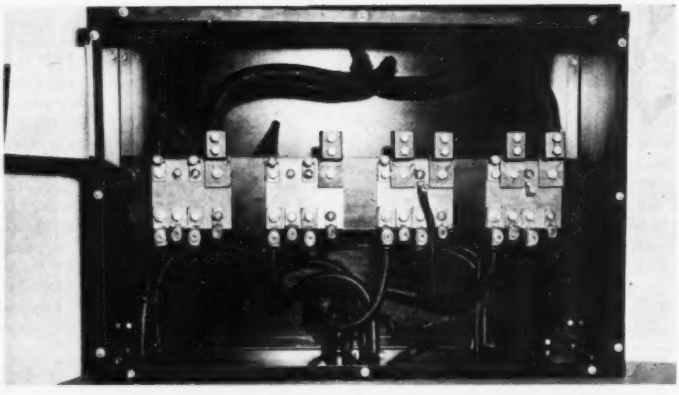
On the other hand the lighting atmosphere created by the luminous ceiling is pleasing and unobtrusive.

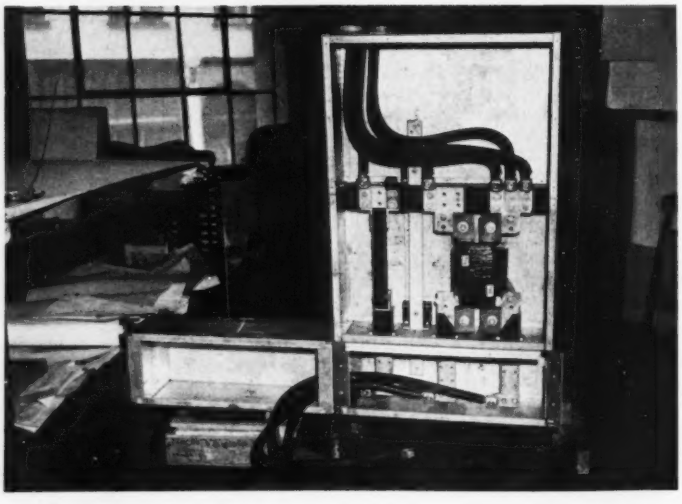
"Lighting the Way to Learning" is a new 20 min. 16 mm color-sound film to tell the story of school and home lighting coordination from the human viewpoint of a little boy. It was produced for the F. W. Wakefield Brass Co., which makes prints available at $250 each, for showing to school groups interested in learning about school room improvements. The prinicpal of the school is the narrator of the conditions existing and what was done to correct them. Proper coordination of daylight with electric light when both are shielded and under control as to quantity and quality are depicted.

American Standard Practice for Industrial Lighting has just been approved by the American Standards Assn. It is a revision of the 1942 bulletin developed by the ASA Sectional Committee under the leadership of the Illuminating Engineering Society. It has been brought up to date as to recent developments in techniques and concepts of lighting application.

Publications that are tools both for selling and designing of improved lighting conditions in commercial and industrial applications are offered by General Electric Co. Lamp Division. Among recent ones are: A color folder giving exact replicas of paint and interior finishes and their reflectance factors—A Reflectance Value Chart. Another is a booklet containing 22 Office and Drafting Room Lighting Solutions. Also useful is a clever Characteristics Calculator for large and miniature filament lamps.







Packaged Cans More Flexible

To further simplify the requirements of utilities for bulkhead and current coil enclosures on customers' premises, the San Francisco Electrical Contractors Assn., through its public relations committee, has been evolving a packaged, "knocked-down" unit illustrated here. While the utilities have had a committee working to standardize and simplify their own requirements, the contractors feel still further steps are possible. They seek a system of standard plates, preshaped and drilled or punched, that the contractor can store easily in a minimum of space and assemble on the job to meet the needs of that particular job. They want a system that makes it possible to increase the size of the enclosure as load is added and to make extensions from it with similar gutter assemblies. The manufacturers, they feel, can make these plates and parts more efficiently than to tailor make present cans or enclosures. The wholesaler can stock these parts easily in packages of flat plates and bolts and terminal strips.

Shown here is a simple unit for three phase, four wire, for bulkhead service connection box. The block with six feeder taps and one line tap and accommodation for future line taps is mounted in it (center picture).

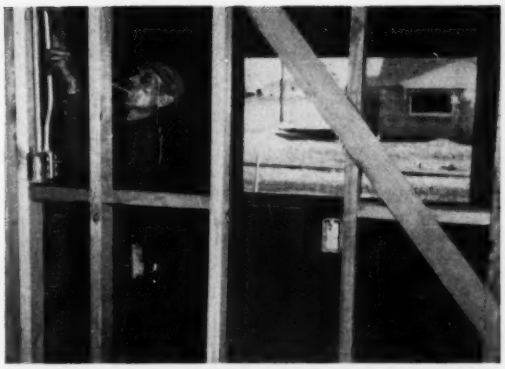
The upper picture shows adaptability if increase in service is desired. In that case a top section is added with another terminal block. Between the two the current transformers can be connected with saddle straps adjustable to accommodate height of the various coils.

The lower photo shows how the enclosures for gutters may be added as required. Wires were installed in these samples and formed into position to show space limitations and adaptability to various conditions on the job.

The capacity of the blocks is 1,000 amp. Only one connection will be required for the neutral. The additional one was put in to show how a jumper arrangement may be used.

It is further maintained by the contractors that such a packaged arrangement is more adaptable to the variety of spaces offered them to mount the bulkhead cans. This is particularly true where additions are made to an existing installation in which space is already restricted by pipes or equipment and a standard enclosure assembly will not fit. With this plan enclosures can be built to fit.

Typical kitchen has chime-clock and range outlet (not visible), breaker panel, ventilating fan and disposal in each tract home



An electric metallic tubing wiring system gives better grounding protection in a lightning region, also room for future increases

Adequate Wiring Primes Appliance Sales

Proof that adequate wiring can be sold to the builder of tract homes has been given by Simon Halle, Colorado Springs contractor and dealer, in several tracts both in Colorado Springs and in Pueblo. In both cities he has been wiring tracts of houses for John Bonforte, one of the leading mass builders in the region.

By a survey conducted among the owners of the first 155 homes in the Bonforte Belmont tract in Pueblo, the value of adequate wiring on appliance sales was further proved. One out of three has added a major appliance within the year. Freezers were the first choice, dryers second.

The houses are wired for electric range and water heater, and carry as standard equipment the following: range outlet, fluorescent light in the kitchen, a NuTone combination clock and chime, a kitchen ventilating fan, a Disposall, a spare circuit for water heater, outlets for an automatic washer. And the job is done in electric metallic tubing.

These are not high-priced homes. Rather they are in the lower-medium-priced class. But Halle, who is first of all a salesman, has proved to Builder John Bonforte that the adequate wiring certificate helps sell the homes and the electrical equipment is part of that adequacy.

The basic wiring system consists of a circuit breaker panel with one range circuit and four circuits for convenience outlets and lighting, plus two spares either for a water heater or dryer or other uses.

Halle believes in an all-metal raceway system, especially for the Rocky Mountain region, where he has been in business since the 1920's. The reason for it, he says, is that it is safer from lightning hazard, and also with a pull-in and pull-out system more capacity can be added by pulling in new conductors without tearing up the walls.

He has selected a split bus Square D circuit breaker panel on many jobs, finding that the flexibility for adding future load is an appealing feature.

Simon Halle of Colorado Springs is a contractor member of the National Adequate Wiring Bureau board and is also president of Rocky Mountain Chapter, National Electrical Contractors Assn., recently elected

The bus is specified to have sufficient capacity for this future load.

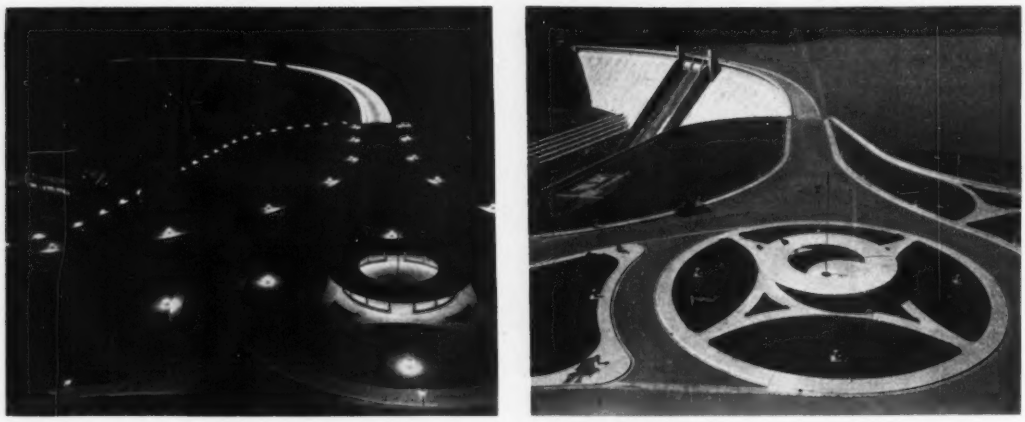
Remote control on lighting is used on many installations. It too sells the idea of convenience and flexibility in switching.

The Belmont tract in Pueblo ultimately will have 10,000 homes. It has been held back by Regulation X but, since that has been lifted, will now go ahead as planned. Bonforte built other projects previously in Colorado Springs, where Halle originally sold him the idea of adequate wiring as a selling feature.

Never one to sell and then forget a customer, Halle has been following up on his wiring jobs as he does on his appliance customers. It was in such a check that he conducted the survey. Of the 155 families he found that 47 had installed equipment other than that supplied. These people were also asked if they planned further purchases. Of these 155, 38 answered yes, noting their intentions chiefly to be for freezers, dryers and some for dishwashers. The availability of the wiring to take care of these purchases was mentioned by all as a strong incentive to the buying as soon as possible.

From experience Halle has divided his business into two separate divisions which meet only in finances—a large appliance store with a service department, and a separate contracting business for wiring and air conditioning and heating on a separate street.

The engineering and contracting company is under Eugene L. Kennedy Jr., managing director.



Night and day views of rotunda area at Shasta Dam showing pedestal lighting units. Roadway on dam is lighted by handrail units

Series incandescent lamps in dome-type fixtures in parking area (left) and in standard highway units at right provide about 2 f-c

Below Eyelevel Lighting

Unusual type lighting units are used at Shasta Dam

One of the interesting sights to the night visitor at Shasta Dam is the effect created by the recently completed lighting system. Series-type incandescent lamps are used to furnish illumination along the roadway approaches and in the parking area. Waist-high "lighthouses" are located along the sidewalks at equal intervals and in the lawn area in proportionate locations. Special fluorescent fixtures are hung along the edge of the low parapet wall. As previously described in ELECTRICAL WEST, July 1949, p 70, the dam roadway is illuminated by handrailing units specifically designed for dual purpose of lighting and guard railing.

The approach roadway lighting standards are of the overhang type having cylindrical 25-ft aluminum poles and 6-ft brackets supporting Westinghouse-type OV-20 luminaires. Ten-thousand-lumen incandescent lamps operating from a 20-amp constant-current transformer provide approximately 2 f-c along the roadway surface.

The parking area, designed for the parking of 800 automobiles, is provided with 42 dome-type fixtures mounted on 25-ft aluminum poles. The fixture holds a 6.6-amp 6,000-lumen incandescent lamp, and is provided with a Holophane symmetrical refractor lens. Spun louvers reduce glare, and the unit provides approximately 2 f-c directly below, dropping to 1 f-c at a radius of 12 ft.

Special fixtures were provided along the parapet wall to furnish sidewalk illumination from the recently completed visitors' facilities building to the end of the dam. A single A-6 slimline lamp and clear glass cover provides a roughly semicircular pattern on the sidewalk varying from approximately 50 f-c directly under the fixture to 4 f-c along the edge of the sidewalk.

Twenty-one low pedestal-type fixtures approximately 18 in. in diameter and 3 ft high are used to provide lighting in the lawn area. The unit is mounted on a concrete pedestal, containing a 500-w incandescent lamp, a cylindrical Fresnel lens, spun aluminum louvers to effect cut-off above the horizontal, a clear Pyrex lens and vertical aluminum fins. The illumination on the surrounding area varies from approximately 12 f-c at the base of the unit to 4 f-c at a radius of 8 ft. Complete absence of glare is achieved by the unique design.

The lighting units were supplied by Columbia Electric & Mfg Co. of Spokane and were installed by the Vincent Electric Motor Co. of Oakland.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Up we go again

Newest witches brews of inflation being stirred up by all unions are given the appealing name, welfare plans. These are considered a legitimate way to crack the wage ceilings since the Wage Stabilization Board unstabilized all wage agreements with its steel industry flashover. Now all crafts and trades are either demanding now or preparing to demand similar 7½c contributions. And enterprising insurance companies are goading them on to cash in on this big volume business. Going quotations on the cost of administering such "welfare" run between 15 and 25% of the take, leaving not much welfare for so much overhead.

Too many cooks

IBEW District 9 in San Francisco is worried that so many locals may have so many plans and these cost so much to run that it is trying to develop a master or uniform plan that all locals can negotiate with contractors. Vice-President Harback has assigned Wallace Barrett, business manager of Local 569, to work on it. District 9 doesn't want "any Cadillacs bought on welfare funds." The problems are many. Wiremen move around from job to job. They shouldn't have to pay big "initiation" fees going from one local to another. Neither Plumbers nor Sheet Metal plans work well.

On the fire now

Portland contractors and union are in negotiations now and one of the issues is a welfare plan. It has been asked for by locals in Everett, Spokane, Alaska and San Diego. In San Francisco there has been sparring but no definite demand. Both California and Northwest Conferences of NECA Chapters have committees to study the problem.

Business prospect

Construction business has begun to show some slowing up. Perhaps it is seasonal, perhaps just that many going projects have been finished. Not as many new ones starting, particularly in private business. Building costs are so high that investment in new building is questioned as to whether it will pay out. Some of the big housing jobs of apartments are not renting as fast as needed; rents are high for small space. New starts in houses in September were less than August though about the same for last year. Some unions have men on the bench.

Prepare against decline

A business development program in anticipation of a construction decline was launched at the National Electrical Contractors Assn. convention. It proposes to spend $175,000 in 1953 in Fortune, Business Week and Wall Street Journal as prestige advertising among top business executives. The idea is to establish NECA members in their minds as the best qualified to handle any electrical job, procure labor, direct it with know-how, buy materials better, know the codes, guarantee their work.

Hard to change

The plan is contingent on approval by 75% of the chapters. They must change their charters to agree to expend themselves at least 15% of the amount of national dues their members pay in local advertising to tie in with the national ads. Dec. 15 was set as a deadline to approve. It is proving too short a time for contractors unused to advertising for business to accept. Recalling what they felt was being rushed into accepting the pension program with the union, some argue this is being rushed too. Change of lifetime habits and viewpoint as to getting work is involved. The program seeks to sell quality instead of bid for price.

Regulation unneeded

On the regulations front things have been quiet. Whether this truce was designed not to irritate before elections or just because materials have become more plentiful, demand less, competition keeping prices down, it is too early to determine. Recovery of the steel industry has been phenomenal. Automatic allotment limits are to be revised upward next year after May. NPA has abolished the Office of Civilian Requirements to make a new Office of Distribution. Self-certification has reduced paperwork in NPA and reduced staff, streamlining organization. Construction regulations have been revised a bit. In residential the only change is that owners are permitted to use without limitation any inventory they had on hand before Oct. 1.

Priority for power

Transformers may be in short supply—both the power distribution and lamp ballast kinds—industry advisory committee meetings were told by NPA in meetings in October. Allotments of steel for the first quarter of 1953 will be 80% of the third quarter 1952 allotment, but this is 20% more than most segments of the industry are getting. Ballast makers will only get 60%. Copper was reported to be ample but not abundant and aluminum will be easy.

Copper quakes

Copper price situation is so complicated by strikes and the price differences paid by wire mills for domestic and foreign copper that it is hard to know where it will go next. Supply seems to be ample but OPS formula for pricing with its 60-40 domestic-foreign factors puts fabricators in a quandary.

Conduit reflects steel

Conduit industry committees met with OPS in mid-October to ask for price adjustments to take care of the increased cost of steel. The industry also pointed out that its price structure has always been a cents-per-foot basis and not a dollars-per-ton. It urged OPS to draw up a tailored regulation on a cents-per-foot schedule.

Pricing changes

Posting of prices for those who come under CPR-34-Services has been amended slightly. On receipt of an official poster with prices on it the poster must be permanently displayed. Ceiling prices for additional services must be kept readily available for public inspection. The GCPR has also been amended as to where price reports may be filed.

Few hardships

The small business hardship program will be continued for the fourth quarter of 1952 to help small firms obtain controlled materials in cases where hardship exists. The same rules apply as were used in earlier quarters, NPA announces. Requests have been few lately.

Lamps rise

Westinghouse Lamp Division followed G-E with a price increase of about 5% on all fluorescent lamps with the exception of the deluxe fluorescents. At the same time it reduced by 16% the price of its fluorescent-mercury lamps as a result of new developments in production. The fluorescents are back to the 1951 level, which is still 40% less than in 1939.

Launch anew

Ray Anson has left Square D Co., where for many years he has been San Francisco branch manager, to join M. L. Fowler as manufacturers representative. The firm will now be known as Anson-Fowler Co., 178 Townsend St., San Francisco 7. It has been appointed factory sales representative for northern California for The Monitor Controller Co. of Boston, makers of motor starters and controllers. Also representative for Blackhawk Industries, Dubuque, Iowa; Feedrail Corp., New York; Heinemann Electric Co.; Pittsburgh Reflector Co., Pittsburgh, Pa.; and Roller-Smith Corp.

Moves

Charles R. Long, district engineer for Westinghouse Electric Corp., Lamp Division has moved his headquarters to the San Francisco office at 410 Bush St.

Line up program

Electrical Maintenance Engineers Assn. of Southern California is lining up even now its program for the big conference it will hold March 18-20, 1953 at Rodger Young Auditorium, Los Angeles. It will start with a kick-off banquet March 18 at a regular meeting. H. R. Meyers, headquarters maintenance engineer for Westinghouse Electric Corp., Pittsburgh, will address that dinner. The conference will follow with five divisions of subjects, over which the moderators will be: Jack Singleton, Lever Bros.; Jack Cochran, General Petroleum Building; L. J. "Stan" Rejda, Westinghouse Electric Corp.; George Larsen, Larsen-Hogue Electric Co., EMEA president; Jack Pitts, Shell Oil Co. Another speaker lined up is R. S. Samuels, American Potash & Chemical Co. The directors of the EMEA, at the request of manufacturers, decided to hold over until 1954 an electrical show such as held in the past.

Unintended

Apologies to R. B. Marxheimer, of Kaiser Engineers, Oakland, for omitting his name as co-author of the paper on Pavement Brightness Measurements presented by him and Dan M. Finch, University of California, at the recent IES National Technical Conference in Chicago.

Where

C. W. Cole & Co. Inc., Los Angeles, is now distributor for Wilson's Luvetile, made by J. A. Wilson Ltg. & Display Inc., Buffalo, N. Y.

Spring meetings

Next South Pacific Regional Conference of Illuminating Engineering Society will be held in Los Angeles April 9-10, 1953. The Pacific Northwest Regional Conference will be held two weeks later in Portland, April 23-24, according to present plans.

Meet them

Columbia Electric Mfg. Co. of San Francisco, makers of switchboard equipment, through one of its partner owners, George E. Fletcher, announces the appointment of Ivan A. Williams as chief electrical engineer and of George J. Vasen as sales manager.

Wire forums soon

Another reminder is given by PCEA of the forums on wire carrying capacity and insulation to be conducted Dec. 3, in Los Angeles at Edison Building Auditorium, and Dec. 9 in San Francisco, at PG and E Auditorium, sponsored by PCEA, California Manufacturers Assn., Western Oil & Gas Assn., to which the electrical inspectors, IBEW, Division of Industrial Safety, NECA and others are invited. Four top national authorities from Simplex, Okonite, Rome and Anaconda will give visual demonstrations and data and answer questions.

For conduit also

To label and identify conductors a clever metal tag called Twist-On, in one piece, without wires or strings, has been developed and used successfully by Lawrence A. Heinle of 35 Arroyo Court, San Mateo. A saw-toothed end feeds into a slot after being wrapped around the conductor, holds it in position and is twisted to lock. The writing surface is etched like an engraving to assure a permanent label.

Variety

P&R coil winding equipment for motor shops, made by Potter & Rayfield Inc. of Atlanta, is being distributed in the West by Tri-State Supply Corp. in Los Angeles, San Francisco and Seattle.

Hp better than horses

An electric wagon unloader, made in Ohio, is featured in a recent issue of Farm Service News, issued by B. C. Electric Co., Vancouver. With it, plus a blower, the farmer says he can transfer silage from the wagon to the silo faster than men can handle it. It operates by a ¼-hp motor through a gear box. It pulls a false end gate by cable.

Musical note

NuTone Inc. announces a new line of ten modern residential door chimes in a wide variety of styles, sizes and prices, from a 2-note to an 8-note Westminster Chime. All electric models can be wired to two doors. A special appeal is found in the combination clock and chime, in which there are several models.

Get the hang

Hangers of several kinds have recently been introduced. Fast Lok Mfg. Co. of Bridgeport has an adjustable hanger especially designed for nonmetallic outlet boxes with a snap-on stud or button without need for disassembly . . . An adjustable bar hanger to eliminate stud notching is offered by PM Electrical Products Co. With marked slots through which a hanger flange is inserted it snaps shut to lock the hanger and forces end prongs into the wood joists . . . M. B. Austin Co. has some parallel switch box mounting straps for hanging a box horizontally in jiffy time from clips snapped on the plaster ears of the box . . . In another category is a troffer hanger designed to speed hanging troffers, called Uni-Hanger by Mitchell Mfg. Co.

Show and meeting

Electrical Contractors of Washington (formerly Society) is to hold its 6th annual convention in Olympia at the time the Puget Sound Chapter, IAEI, holds its next meeting, Dec. 12-13, in the Civic Center. Featured will be a wiring materials exposition by manufacturers. A conference program is planned at the same time. T. Ralph Neilson, secretary-treasurer, says the association plans to launch an industry monthly paper, a tabloid, 8-page paper, of which he will be editor and publisher, mailed free.

Progress

Work on a proposed new draft of the Washington State electrical code by committees of the Washington State Electrical Council was reviewed at a meeting in Yakima, Oct. 18. What further steps are to be taken were not announced. C. D. Casey of Seattle heads the Council.

Train them

New lighting consultants of the Southern California Edison Co. start a 6-week course covering company policies as well as practical lighting techniques, Nov. 3. It will be taught by Jack Rohring.

Expands staff

Western District office of NECA plans to add another field man and also one on line construction, according to Matt Sherwood, field director. Importance of the Western area in construction business is implied in these moves. Search is on for qualified men for the posts. A new manager for the East Central California (Fresno) Chapter, to succeed Stanley Ingraham, has been appointed; name, Buckley. Ingraham now manages a truckers association.

Joint

Desert and seashore meet when the new Nevada Chapter of NECA plays host to the California Central Coast (Santa Barbara) Chapter in a joint meeting in November.

Eager to learn

Estimating class enrollment has surprised many chapters of NECA that have offered courses to members. The Northern California Chapter has a class of 57 going, with fine attendance. San Francisco Chapter stopped taking any more into a class of 50.

Uniformity needed

Uniform permit fees for electrical work are being sought in the East Bay cities around Oakland by the committee working for uniform electrical codes. Ernest Nelson, San Leandro electrical inspector, and Ernest Kramm, manager, No. Calif. Chapter NECA, are working it so that contractors doing work in any of the cities will know what fees apply.

Transfer

Gordon O'Hara has been sent to Salt Lake City as representative for the Trumbull Electric Mfg. Co. He has been 10 years with Trumbull in the Seattle office.

Boss needs welfare

With all the pension and welfare plans for electrical workers it was high time some welfare plan be developed for the owners of the business, who work longer hours and run greater risks of financial loss than well-paid union workers. The San Francisco Electrical Contractors Assn. sent that suggestion to the NECA convention to act upon. The Oregon-Columbia Chapter has an insurance plan for its members that includes hospital benefits. NECA does have a committee studying a plan to extend some of the welfare benefits to nonelectrical-worker members of their companies, including the boss.

Code makers

W. R. Volheye and John C. Hewitt have been appointed to the National Electrical Code committee of NFPA. W. R. Volheye is state electrical inspector for Oregon and will serve on code making panel 3. John Hewitt, Washington state electrical inspector, will be on code making panel 10.

Rewarded

Dan Shields of Fullerton and **Harry Foor** of Covina were two Southern California Edison Co. lighting consultants whose outstanding work during the year earned them a trip to Nela Park, Cleveland, for an advanced lighting course.

Light trap

San Quentin Prison is doing an extensive floodlighting job on its outer walls. On 8-ft poles some 350 units of 1,500-w are trained on the walls and surrounding mud flats to silhouette any attempting escapee. The eventual job will run to 1,000 kw of lighting. It was designed by R. Lee Jamison, associate electrical engineer, Division of Architecture, Sacramento. Some basic planning on the idea was done originally for former Warden Duffey by James Barnes of PG and E.

Up to date

RLM Standards Specification Book in its revised edition is now in print and copies are available from the RLM Standards Institute, 326 W. Madison St., Chicago 6. It contains specifications for 18 of the most commonly used industrial lighting units and two new specifications for high bay units. Several important revisions are incorporated.

Trailers safe

Inspector objection to the way many trailers for dwelling have been wired has brought improvement and Rollohome Trailer Coach Co. of Marshfield, Wis., now advertises that its trailers are wired to standards of NFPA Bulletin 501. Each has a 115/230-v, 3-wire system with an independent grounding wire.

See and select

Joe Rosenberg, wholesale lighting fixture dealer, has opened a new fixture showroom at 7960 West 3rd St., Los Angeles, featuring Lightolier fixtures for the trade. Cards issued by contractors to their customers are used to direct them there to select fixtures displayed.

ELECTRICAL WEST Sales Guide

News Letter

November 1952 ©

FOR THE ELECTRICAL MERCHANT OF THE WEST

Now that elections are over, how's business? TV sales unpeaked themselves but the general level of appliance business is good. Distributors report renewed dealer buying, some shortages or delayed deliveries but good prospects for a fine Christmas business. Although gloomy predictions as to steel for appliance making continue to come from NPA the manufacturers seem to be turning out ample volumes and are becoming competitive in advertising and promotions and even prices. Increases that might be expected from higher wages and steel and materials are being held off as long as possible. Only TV sets have shown price raises so far. Other appliances haven't been decontrolled but neither have manufacturers applied for price relief as yet.

Where do we go from here?

When controls were reimposed on radio-TV parts RTMA raised so strong a protest at the increased paper-work cost it means that an appeal was heard. OPS did suspend clock-radio controls and also the compulsory warranties and services, interest rates, etc., on items removed from price control. It changed CPR 34 affecting appliance and radio-TV service to have shops post service charges on OPS charts like grocers. Wants to set maximum time allowances for most TV repair services. OPS was also reducing staff, decentralizing, and with a new administration, getting ready to fold if unrenewed in June.

Controls flutter

Fair Trade is having to fight for its renewed life. In several places obdurate price cutters are defying the new law and forcing new court tests. One in Pennsylvania has even sued G-E, charging the manufacturer with violating a state law. G-E has been bringing suit against violators in many places. Sunbeam has a suit against Grayson-Robinson stores in California.

Unfair fight fair

FTC Commissioner Lowell Mason made a significant point at the NAED Coronado convention (see p 111). Fair Trade laws only permit a manufacturer to control price of his trademarked product vertically. If he owns a distributorship and dealer outlets he can set his own dealer prices but cannot have agreements with other retailers. The Eastman Kodak Stores case decided that.

Don't step sideways

Food plan fever seems to be subsiding too as the public finds it can buy freezers independently and grocers and markets offer quantity prices to match food plan "wholesale" lists. Some of the many sales organizations are leaving the West to find green pastures in the East where such plans are just beginning. The stronger food plan companies are still selling aggressively, however.

Food plans

Major events

Big events in November: Fall Industry Meeting of the Los Angeles Electric League, at the new Statler Hotel Golden State room, Monday, Nov. 17. Speakers are Dr. Franklin Gilchrist, USC Dept. of Marketing, "The Discount House--Another Revolution in Retailing; the Future of Distribution?" and Dr. W. H. Sener, director of communications, Hancock Foundation, "UHF--What It Means to the Dealer." A mink stole is a gate prize. . . San Diego's 15th annual Electrical & Home Appliance Show at Balboa Park, Nov. 28 through Dec. 3, by Bureau of Home Appliances, using four big exhibit halls, expecting crowds of 200,000.

Sales stimulants

Promotions a comin'--In B. C. an automatic clothes dryer salesmen's contest sponsored by 11 makes and B. C. Electric Dealer Section. . . In northern California an electrical housewares for Christmas campaign to tie in with NEMA's national ads, sponsored by a new housewares chapter of Northern California Electrical Bureau. Also a series of Jack Lacy sales training courses in San Francisco, Oakland, San Jose, Sacramento and Fresno, 4 nights each, beginning Feb. 2, being scheduled. . . In San Diego a "Yes-but" retail sales contest has been finished, an electric range campaign is going, an educational TV program with schools is under way and the Bureau of Home Appliance electrical housewares committee began a gift promotion. . . Lighting division of Los Angeles Electric League will distribute through Dept. of Water & Power and others a home lighting fixture booklet, backed up by dealer sales training. . . In Spokane, while the place is a tizzy over coming of TV by Christmas from two stations, home light conditioning is being promoted and an electrical gift campaign is on for Christmas by the Inland Empire Electric League. . . In Arizona the gas drive over Appliance Merchandisers Assn. will go electric again with a Christmas Housewares campaign. A very successful Reddy Kilowatt Electric Show was held in Prescott as part of a tour of Holbrook, Winslow, Flagstaff and Cottonwood in Northern Arizona Light & Power territory.

Next year's calendar

Coming next year are these events--Los Angeles Market, Jan. 26-30. Western Winter Market in San Francisco Merchandise Mart, Feb. 2-6, with radio-TV and appliance trade dinner Feb. 4. Western Merchandise Exhibitors Assn. will have its spring show at the Civic Auditorium, the Mart and several hotels Feb. 1-4; Pacific Northwest Show of gifts and housewares and lamps will be at Seattle, Feb. 15-18; in Portland, Feb. 22-25. . . PCEA will stage dealer meetings in eight cities in February on the selling problems of each area. . . California Home Economics Assn. will hold its 4th biennial convention in San Francisco's Palace Hotel March 28-30; Marguerite Fenner, PG and E, is chairman. . . 1953 Electrical Home Show will be held by Sacramento Valley Electric League in the municipal auditorium, May 21-24. . . Pot & Kettle Club annual convention will be at Arrowhead Springs Hotel June 24-28. . . International Assn. of Electrical Leagues will hold its first convention in the West at San Francisco's Fairmont Hotel Aug. 4-8.

Heat bothered

As the heating season approaches the electric heat policy situation of various utilities, public and private, is snafu but good. Each wants something different in the way of load limiters, thermostats, trick wiring layouts to cut off water heaters and range or vice versa, limits on heater size, etc. Even PUDs have awakened to what electric heat is doing to demand and are in the act. What is needed is a conference of all concerned--utilities, manufacturers, contractors and dealers, to arrive at some uniform policy. Right now everybody is fighting.

Expanding

Some big new dealer stores: Harold Kelley, Portland, bought the 2-story Benton Bldg. in which to expand. . . Arc Electric in San Francisco and Dunkley Music Co. in Ogden both have fine new stores.

Strong spokesman

Mort Farr, straight talking, constructive and sales-minded dealer president of National Appliance & Radio-TV Dealers Assn. lifted the morale of dealers in Seattle and Bakersfield in meetings a week apart in October (see detailed story next issue). In Seattle it was the Northwest Appliance & Television Assn. he addressed, talking frankly yet with concrete suggestions on how to improve the "Faults of the TV Industry and Their Correction." He told how integrity must be restored to the business by all concerned. In Bakersfield he participated in an afternoon forum on television and white goods and in the evening was principal speaker to the salesmen's appreciation annual dinner of the Bakersfield Radio-TV & Appliance Dealers Assn. Other prominent speakers at the forum and dinner were Owen Klepper of Philco, Bud Schuster of Hoffman Radio, Gordon Boyle of O'Keefe & Merritt and LeRoy Bennett, Northern California Electrical Bureau. John S. Gray presided. Dealers Harold Witham, Joe Sonderegger, Don Wheeler, Phil Urner led the forum.

UHF digestion

What, besides TV, to sell for Christmas is almost eclipsed by the TV fever running high especially in expectant territories. Dealers in such places are like fathers pacing outside the maternity ward. In Portland, however, UHF has been a headache and impatient purchasers have been returning sets because UHF adapter coils or converters have been so low coming. Spokane's two stations are expected on by Thanksgiving; Salt Lake City's two new transmitters atop 9,428 and 8,900 ft peaks are expected operating before Christmas; Honolulu has one due Dec. 1; Denver has a second station on the air, KBTV.

Also to be sold

In the housewares lines there is going to be heavy promotion until Christmas, sparked by the NEMA program. But each manufacturer has some new features to extol even on old favorites. In blankets G-E is playing the whole spectrum in color selections. By the way, both G-E and Westinghouse have substituted a trade-in on a pro rata basis rather than make blanket repairs. G-E also has a new automatic travel iron, claiming it to be the first automatic. . . Universal (Landers, Frary & Clark), besides featuring the Jet 99 cleaner, has dressed up its housewares line, including heating pads, blankets, waffle iron and a travel iron in an attractive plastic box. . . Broil-Quik Infra-Red Chef is being advertised with a big national magazine campaign. . . Seth Thomas is featuring some special designs for Christmas gift clocks.

1953 lines

In white goods it has been a month of 1953 showings. Crosley, which started the fall showings of next year models, brought its Western distributors meeting to San Francisco Oct. 21, a 30-people show with spectacular effects and Bill Blees' outspoken comments. Featured were a line of room air conditioners for next year and a reduced line of Shelvador refrigerators in 8 models and 2 2-door models, all with shelvador and horizontal freezing compartment. . . Gibson's distributors like John Luckanish were showing that line's new color trim in refrigerators, its double-oven range reduced to $299, upright freezers to come in December (18-ft), January (25) and February (32 two-door).

Coming innovations

Among major appliance news is that Thor dropped $50 from the price of its automatic washer for a special promotion, from $299 to $249. . . Thermador is readying a new automatic dryer for introduction in about 4 months. . . Kelvinator, which acquired ABC washer, is soon to have a new dryer. . . Marshall-Wells owned Zenith washer plant is about ready to bring out an automatic washer. . . Servel, which made a sensation with its electric Wonderbar, is about to spring an electric compression-type refrigerator, said to have a completely new way of making ice cubes without trays. . . Muntz will make room coolers soon.

This state of flux

Manufacturer acquisitions and television are both bringing about many distributor changes these days, f'r instance: Speed Queen Corp. has appointed Lou Johnson Co., Portland; J. W. Phillips Distributing Co., Seattle; Tubbs Electric Co., Spokane. . . Royal Vacuum Cleaner named Radio Television & Appliance Co., Seattle, and Radio Television Supply Co., Los Angeles, and Schafer-Wright Inc., Portland. . . Lavenson & Savasta, San Francisco, now distributes One-Minute washers and dryers. . . Home Makers Supply Co., Portland, was selected by Swiss-made Phoenix as distributor of its sewing machines. . . General Air Conditioning Corp. of Los Angeles has made Walter B. Lloyd Co., Salt Lake City, exclusive distributor in that area. . . Meier Electric & Machine Co. of Indianapolis, makers of Nu-Air portable electric heaters under Wesix license, air dehumidifiers and fans, has appointed O. B. Wilt of San Francisco its Western factory representative. Allen Pontius, former Meyberg Co., has joined Wilt. . . Horn & Cox are now Chrysler Airtemp Sales Corp. distributors in southern California. . . Philco in Los Angeles has made C. & C. Appliance Inc. of San Bernardino distributor for that city and Riverside. It was formerly held by Great Counties Appliance Distributing Inc. and Robert Noble of the latter has gone to Washington and Oregon to be Philco district representative. . . Ed Nystrom, San Diego Kierulff & Co. manager, commutes to Washington state where he has distributorship of Amana for that state and Alaska. . . Robert F. Clark Co., Denver, distributes Domestic Sewing Machines now as well as I-H, American Kitchens, Blackstone and Hoffman. . . Webster-Chicago Corp. is consolidating all of its consumer products with its 162 distributors carrying the complete line, eliminating the parts jobbers.

particularly in TV

In television distributorships--Kaye-Halbert has made Western Furniture Sales of Phoenix a distributor, in Portland it is The Moore Co. . Dave Lindsay Co. in Portland succeeds Schafer-Wright Co. as Hallicrafter Portland distributor. Schafer-Wright now handles Raytheon. . . Western Radio & TV Co. of Tacoma has bought a building in Spokane to open there. . . Herb Names of Denver, former prominent dealer, is now a distributor for Sylvania. . . Stusser Electric Co. of Seattle is now Sentinel Radio Corp. distributor. . . Home Makers Supply Co. is Stewart-Warner distributor. . . Key Co., of which Roy Chilton is president, distributes Mercury TV in Portland, Spokane and Seattle from offices in Portland. . . Western Radio & TV Supply Co. in San Diego formally opened its remodeled place at 1415 India St. . . Kaye-Halbert has made Steve Young manager of its distributing company in San Diego. Kenneth J. Dahm, housewares representative, Denver, has moved to 1164 Elatt.

Men on the move

Among people: Don Wagener, formerly in the southwest district at Dallas as Procter Electric manager, is now Western regional manager in Los Angeles and F. J. Davis has gone there too from Seattle as district manager. . . Paul Bryant has been made Western sales manager of Zenith Radio with headquarters in Los Angeles, a former Meyberg and Herbert Horn man. . . Mark W. Battersby, Pacific Northwest district sales manager of Murray Corp. home appliance division, has been promoted to West Coast regional sales manager in San Francisco. And F. S. Lodge, district representative in Utah, Nevada and Pacific Coast area was made distributor coordinator. . . American Kitchens Division of Avco sales training director, Ken Cook, is now Western Division sales manager. . . O. Robert Coblentz, Los Angeles, was named Western division manager for DuMont. . . Jack Marshall has resigned as district sales manager of Easy to affiliate with his brother. . . James D. Lane is new field sales representative of Emerson Radio in the Northwest, in Portland. . Paul Buehler has left the L. J. Meyberg Co. . . Jack Canady is now sales manager of Palmer Mfg. Co., Phoenix.

Attractive exhibits of appliance distributors dominated the combined home and appliance exposition at San Francisco Civic Auditorium

The Show That Was Different

Lots of things were different in the Western Living and Home Exposition staged in San Francisco, Sept. 27 to Oct. 5. It was a combined home show and appliance show, both gas and electric, instead of the previous Electrical Wonderland. It was sponsored jointly by Northern California Electrical Bureau, Associated Home Builders of San Francisco and the Gas Appliance Society. It made a special feature of modern lighting for the modern home. The S. F. Electrical Contractors Assn. and Local 6 of International Brotherhood of Electrical Workers did an outstanding job of presenting and promoting adequate wiring from exhibits prepared by the public relations committee of the association, headed by Roy Mosher, Lloyd Flatland and President Emil Weber.

It was different too in that it attempted to draw attendance by big name entertainers, which caused the admission price to be high. The entertainers evidently did not draw for a TV blasé populace. The majority of those attending came because of home building and equipment interest, and therefore were good customer prospects. These did not like the lights turned down while the show was on for they had come to see the home ideas. Although attendance was about 75,000, which did pay for the show, most exhibitors expressed satisfaction that they had a better chance to talk to the persons interested.

Appliance distributors of all major makes were represented and in many cases dealers helped man the booths. There were 11 makes of electric range, 12 washers, 9 refrigerators, 17 television shown.

Along each side in the Hall of Light were model rooms, in decorator color schemes, with moderne furniture, lighted with modern fixtures according to the recipe plan. (Story next issue.) This was a different way also to show home lighting.

San Francisco Electrical Contractors and IBEW Local No. 6 told of Adequate Wiring in one wing apart from main auditoruim display

J. Clark Chamberlain, standing left, as Ed Meise reads scroll of appreciation to him. Seated left, John Sharp; right, Dr. DuMont

Appliance, TV Futures Told

Instead of the usual machine-gun pace of its semiannual sales conferences the Bureau of Home Appliances of San Diego County relaxed on its laurels with a stately banquet to celebrate its 20 years of successful operation. This anniversary was celebrated by almost 700 at the great rotunda ballroom of Hotel del Coronado, Sept. 26. Yet amid the honors paid to its founders, its presidents and J. Clark Chamberlain, its dynamic manager, two nationally renowned speakers presented their forecasts of business opportunities in appliances and television for the years ahead. In that sense it was still a sales conference. John C. Sharp, president, Hotpoint Inc., and Dr. Allen B. DuMont, president, Allen B. DuMont Laboratories Inc., made it so.

Appliance Outlook—John Sharp

"Actually the future of the industry was developed here," said Sharp, recalling that the original Hotpoint plant was at Ontario, nearby. In a quick review of the growth of the electrical industry he made a parallel between it and the automobile industry. In it the automobile gave an economic reason for extensive development of petroleum. "Oil lamps and axle grease would never have furnished the impetus," he said. More than five million new jobs have been created in the electrical industry and related industry because of electricity used extensively.

To measure progress made and opportunities still open Sharp quoted national saturations. These figures, he said, assured a future market far greater than anything known in the past.

Business indicators promising good sales potential he listed as: (1) Disposal income 3% higher than the 1951 peak. (2) Savings at an annual rate of $17 billion, the same as last year. (3) Accumulated savings continue to rise, indicating a vast stored buying power. (4) Employment running at 62 million, near all-time peak. (5) Recent upturn in retail business. The trend is up: last year it was down. (6) The nation's economy is exhibiting a healthy growth. But competition is increasing and it becomes more difficult to pass on price increases to consumers.

Home is a Chemical Laboratory

That it is women the industry must satisfy, Sharp maintained. "It is the women of America who are our customers and, believe me, they are very discriminating people. We have found that in spite of the most rigorous tests we can give an appliance in the factory laboratory, a 110-lb woman can put it through stiffer paces in her home.

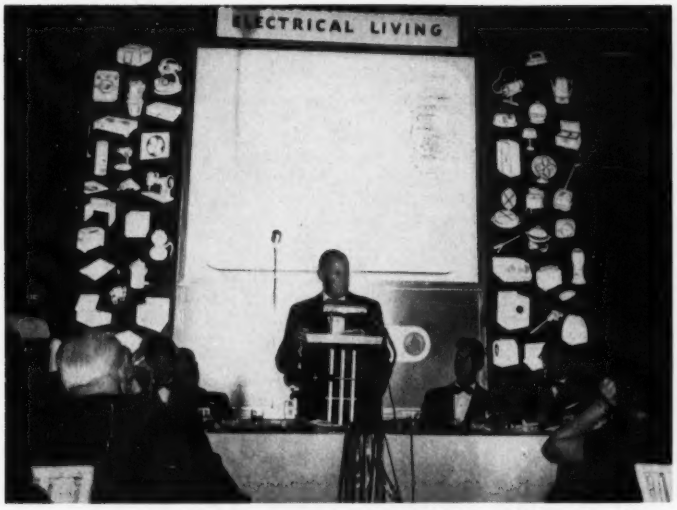
"The average kitchen and laundry are really amateur chemical laboratories. Acid, alkalies, fats, oils, chemicals, live and dead tissues all pass through the kitchen, many of them through the laundry. Heat, cold, moisture, dryness, pressures and vacuums are involved. And the newspapers and magazines continually concoct new mixtures and processes. Soap, food and chemical companies compete in bringing out new witches brews. Some of these are helpful, others increase repair part sales.

"Aluminum was first produced successfully in a home kitchen—probably some man cooking when his wife was away. I believe the first atom bomb must have been conceived in someone's kitchen. I am not joking when I say that the only heating units satisfactory for use in the Oak Ridge Atom Bomb plant during the war were ones that had been developed to survive a deluge of boiling baby formula.

"There are many other problems: Hot water dissolves porcelain enamel and attacks monel metal. Many new soapless soaps or detergents can chew up aluminum. Butter can cause rubber to swell to several times its normal size. Fumes from baking bread, if sizable, cause zinc to crumble and copper to turn to dust. One drop of hot berry juice on an oven lining can eat a sizable ulcer in the enamel in a matter of seconds. I never cease to marvel at the human stomach that survives destructive compounds that wreck the best man-made materials."

Contrary to popular opinion, Sharp continued, new products are not introduced because they are demanded by the public. It is just the other way around. A product is developed and then it is up to salesmen to create a need for it.

"An automatic dishwasher is a logical piece of time-saving home equipment, but we must admit quite frankly that after spending millions of dollars promoting and advertising them, most women still doubt they are as good as we say they are . . . Radio and television did not have the same trouble (changing habits), because they offered completely new services." The dishwasher, he went on to say, is further complicated by being both an electrical and a water bearing device and that involves the plumbing trade. "Until sales methods and installa-



Silhouetted against huge TV, Dr. DuMont told of TV's future. Seated left, John Sharp, Harry Calloway; right, George Stoltenberg

at Bureau 20th Anniversary

tion techniques have been standardized, we cannot expect the dishwasher to make rapid gains."

"Yet television sets are being bought in fringe areas where it is necessary to install a $100 aerial. The need has been thoroughly established. Where need has not been firmly established, as in the case of dishwashers, installation is a definite problem."

That the manufacturer must assume his responsibility in advertising and education, Sharp agreed, and said that television would be used to do that, announcing Hotpoint's new TV show, "Adventures of Ozzie and Harriet." He said he hoped not only to make television an advertising medium but use it to show people how with automatic appliances they can be freed from the kitchen to watch television.

Sharp assured the dealers that every leading manufacturer today is aware of the distress merchandising practices, knows that he is being criticised by dealers and distributors, and is doing everything legally possible to correct these conditions. But it requires a united effort of all who make up the industry.

Concluding with some speculations about the future, coming from a man who has helped develop the enclosed rod or Calrod-type heating unit, the push-button range and other notable appliance inventions, his forecasts were considered important. Of the future Sharp said:

"Most houses today are far from dust free. With acceptance of home air conditioning, advanced automatic cleaning equipment, dehumidifiers, electric heating, dirt in the home will become a thing of the past.

"Home lighting is making great strides . . . It is necessary to educate the public to accept higher light levels, to make working and relaxing in the home more pleasant . . . Home food preparation is undergoing a revolution, however, it is questionable whether electronic cooking will be the preferred method. Differences in food taste and appearances are not desirable to most of us."

Television Outlook—Dr. DuMont

Known familiarly as "the father of television," the well-informed Dr. Allen DuMont gave this large group the latest information about television, color, UHF and its growing market opportunity. After a brief review of the history of TV from the first English invention in 1883 to the present satisfactorily operating system, DuMont said the freeze by the Federal Communications Commission had delayed progress. It had been brought about because original allocations of 12 Very High Frequency channels on a theoretical 50-mile radius basis had resulted in interference between stations on the same channel 90 miles apart in Detroit and Cleveland. In order to reshuffle the allocations a freeze on new applications was put on and for three years no new licenses were granted.

Color then came into the situation and further complicated and delayed matters. In the estimation of the industry, Dr. DuMont said, the commission did not come up with a satisfactory system when it accepted the Columbia Broadcasting System's whirling disc system. The government, he said, decided the public would have it, "come color or high water."

Since CBS itself purchased a TV set making plant, he added, and came up with the problem from a manufacturer's standpoint, it now feels the same as the rest of the industry and has joined the National Television Systems Committee of technical men from all the industry to help develop a satisfactory electronic color telecasting system.

The Columbia system had many defects. It required a disc turning in synchronism in front of the picture tube. The flicker rate was slower—24 per second. It was limited to a relatively small picture. With present 24-in. tubes it would require a 6½-ft disc run by a 15-hp motor, an obvious absurdity in the home. Nobody is making and nobody today is broadcasting this color system.

The system being developed by the industry committee, he said, is coming along satisfactorily. It uses three electron guns inside the tube, one for each of three colors. Its chief difficulty today is that it will still be too expensive to make; will cost about $200 for the tube alone in mass production and that would make table model sets cost about $600 at retail.

But such a system has many advantages. The detail in the picture is as good as in black and white. The flicker rate is the same—30 per second. The larger the tube, the easier it is to make. The system is compatible, that is, all present black and white sets can receive the color pictures in black and white. DuMont predicted that it would be from five to ten years before it would be marketed.

The 12 channels available before

the freeze, DuMont said, did not provide enough stations for true competition between networks. Now 72 Ultra High Frequency channels have been added and a possible 2,200 stations can be licensed. All of these will not be established for some time, but instead of the 100 stations now there will soon be 300 or 400.

UHF has some differences in characteristics that limit its use. The beam is more like a light beam and in hilly or obstructed country the beam is sharply cut off. Thus it will not work so well in certain areas.

As for the receivers, they are not complicated, he assured. Most of the present sets can be adapted by minor changes and use of printed circuit strips for the UHF channels. Sets made prior to five years ago will need a converter. All UHF requires a special antenna and lead-in wire. The present ones do not work well. Antennas are being developed by several companies to receive signals for both VHF and UHF.

The new channels will greatly increase the television business, said DuMont. Many networks have been having difficulty operating in the black. As new stations are opened all networks can get outlets and thus reduce the cost per viewer. More stations will also justify four microwave circuits coast to coast. This will improve both the choice and quality of programs.

Educators are now experimenting in teaching by TV, DuMont described. From a central point good educational programs with the finest teachers and making use of the best visual aids can reach many areas.

Industrial uses of TV will be the largest part of the business someday, Dr. DuMont predicted. Already it is used to watch industrial processes involving dangerous operations by the Atomic Energy Commission. There are many other applications, even with three-dimensional viewing.

For a quick look ahead five years and back, Dr. DuMont recalled there are 18 million sets today, 6 million in 1946; in 1956 there will be 45 to 50 million. In 1946 there were 6 stations, now 108, in five years 700 to 800. Television will grow more in its educational, military and industrial uses. It has already shown a marked effect on people's living and will continue to do so.

Bureau's 20 Years

Besides the two featured speakers the occasion was a celebration of a major milestone in the life of the cooperative promotional association of dealers, distributors, utility, contractors and service organizations. And it was the climax of Electric Living Week in San Diego, begun with the dedication of a new 66,000-kw steam generator at San Diego Gas & Electric Co.'s Silver Gate plant. President Emory Sherwin and Mayor John Butler were televised starting that new unit to add capacity to growing San Diego's demands.

It was presided over by George Stoltenberg, bureau president, a local electrical appliance dealer. Harry Calloway, a past president of the bureau and now also national president of the Music Merchants Assn., acted as toastmaster. Gordon Dawson, immediate past president, was presented with a plaque in appreciation of his work. All of the living past presidents of the bureau were there and were introduced.

A surprise feature was a humorous review of historical events and the corresponding activities of the bureau during the past 20 years. A giant mock TV set on the stage, surrounded by pictures of appliances, was used to show cartoons and pictures. Dan Turner, who teaches the bureau's sales classes, introduced it. George Hankins of Burns - Chase agency produced the script.

Appropriately too, J. Clark Chamberlain, who has guided the bureau for its 20 years as secretary-manager, was surprised with a scroll of appreciation signed by all the past presidents and presented to him by the first president, E. W. Meise, San Diego Gas & Electric Co. A 32-page souvenir book telling the history of the bureau was distributed.

Montana Power Tells Trade Policy

Setting itself definitely on record, the Montana Power Co. has issued to the electric and gas industry, and to company employees in Montana, a clear-cut statement of policies, practices and plans. In the foreword by J. E. Corette, president and general manager, and D. J. McGonigle, general sales manager, the company states a principle that it believes the people of Montana will receive the best possible service if all branches of the industries work together and make their individual contribution to the whole.

Then follows a statement of what it considers the manufacturers' part, the distributors', dealers', architects' and electrical contractors', the plumbers' and the power company's part in such a program. It gives assurance there is no power shortage in Montana, it reminds of reasonable rates and then sets forth the company's policies as to private enterprise, cooperation with rural electrification associations, industrial development, agricultural development, information distribution, codes and installation standards. It offers to make available residential mailing lists as well as lists of restaurants, architects and commercial customers.

Listing other services, the company offers its associates in the industry to further electrical progress: dealer appliance displays in its offices, use of company auditoriums for meetings, labor for range and water heater service to customers and for commercial electric cooking also, first aid wherever adequate electric appliance service is not locally available, operating cost calculators for salesmen to use, radio-interference tracing, sales training for dealers and salesmen, information on water heating, promotion of adequate wiring, 4-H farm and home electric projects, movie and sound-slide library, participation in company-dealer appliance shows and exhibits.

The booklet also contains data as to customers and representatives of the company in various divisions, its residential rates, etc.

As to appliance selling the company says it has not sold directly since 1941 and the policy is still in effect with three reservations: (1) The company reserves the right to return to appliance selling if such a move is necessary, (2) it reserves on the behalf of its employees special appliance offers by manufacturers, and (3) the right to sell lamp bulbs and such lighting equipment as may be necessary to provide its customers with modern lighting because residential lighting has not developed satisfactorily under the nonmerchandising policy.

The company pledges neutrality as between makes and dealers and to show no discrimination between electric or gas appliances. It states its policy on electric house heating. It declares the company will not refuse to render service to a complete electric house-heating installation although it warns that such over-all heating is more expensive than with other fuels in that region and in that climate. However, it recommends supplementary house heating by electricity and welcomes such applications. It also offers the advice and help of advisory staff of specialists and home economists.

Lucile Ramirez, right, teaching a group of students in WWP program for the training and

Recruiting of Home Economists

Where to get trained home service representatives when marriage or some other reason causes them to leave the employ of a company has always been a problem.

In order to cope with this situation and to lay groundwork for filling possible future vacancies in home service department, Washington Water Power Co. has been running a summer training program for junior home economic students. It also gives college girls who are interested a vision into utility home service.

The course is planned for junior home economics students in local colleges. The students are interviewed and hand-picked with the assistance of the dean of home economics at each school. They are paid a nominal salary for the time spent in training.

The course of training stresses company policies and procedures, the care and use of electric ranges, freezers and laundry equipment. It also includes basic home lighting, says Lucile Ramirez, home service director of the company.

Special emphasis is placed on salesmanship, customer calls, group demonstrations, techniques. Members of the class are given experience actually doing all these things in the kitchen laboratory and auditorium, before groups and finally performing before groups in the Inland Empire region.

This training class for junior home economics students was started four years ago and there has been a maximum of eight in the class. The course extends over a six- to eight-week period of concentrated work.

"We have been pleased with the enthusiasm of the class members at the end of the training period," Miss Ramirez said. "A number of them have gone back to school and assisted themselves financially by working part time for an electrical dealer in the college town in which they are located. We feel that this project is a worthwhile one for it brings us in closer contact with local colleges. It opens a field for home economics students besides those of teaching and dietetics. It gives us trained home service personnel if they desire such employment."

● **A case study** of a typical electric company's residential lighting promotion, based on actual experiences of 18 small and large utilities, has been arranged as *The Home Lighting Story of Company X* by Edison Electric Institute. Its purpose is to assist and encourage similar programs in the home-lighting market. It illustrates the operations in practices now used successfully by many utilities and shows how promotional methods described can be adapted. It covers training, educational activities, sales promotion, special campaigns, results and conclusions. It is available from Edison Electric Institute, 420 Lexington Ave., New York 17.

Saturations Studied

First fruits of an appliance survey in the Yakima valley area by Pacific Power & Light Co. have been a new appraisal of the saturation of electric appliances on the lines of that utility, which serves in Oregon and Washington.

Electric ranges are used by 71% of urban and rural homes, 69% have electric water heaters. This corresponds to a national 23% range and 13% water heater saturation. Refrigerator saturation is 92%, radio 97% and 11.2% of the homes have home freezers. Automatic washers have grown in acceptance to a 21.5% saturation, with clothes dryers in one home in 20. Electric bed covers are in use in 6.2% of the homes.

Another phase of this survey was to determine buying intentions. These showed that ranges, water heaters and home freezers topped the list with about one home in six a prospect for purchase of one or another of these appliances. Automatic washers came next on the list.

Average annual residential use in the Yakima valley area follows closely the utility system's average of 5,288 kwh a year and hence this survey in the Yakima valley area can be taken as typical of conditions on the entire system.

Home Light Drive

A floor and table lamp campaign enlisting the employees of Southern Colorado Power Co. as volunteer salesmen is being conducted in Pueblo and other cities served by that company. It opened Oct. 15 and runs through Dec. 25 and is open to employees, their wives and husbands. Cash bonuses and prizes are offered for lamp sales.

Meetings were held in September to brief those interested in the campaign on the sales story to give in their contacts with customers at their homes.

E. H. Pemberton, commercial manager, has also been working on a community plan for garbage-disposal units in Pueblo where a garbage problem has become serious. Meanwhile among employees a special on G-E Disposalls has been offered.

ELECTRICAL WEST

Another Uprising Against Bigness

PEOPLE like home rule. People fear and abhor Big Government. Both of these reasons were behind the movement inaugurated by the California State Legislature early this year to buy from the U. S. Bureau of Reclamation the great Central Valley Project. The same reasons are behind the program proposed last month by Ford Northrup of the Eugene municipal utility system that Oregon, Washington, Idaho and Montana organize a Northwest Power Commission to take over the electric generating and transmission facilities of the USBR, Army Engineers and Bonneville Power Administration in that area.

In his proposal that the hydroelectric resources and development of the Pacific Northwest be independent of government bureaus in Washington, Mr. Northrup lines up some potent arguments. Here are some of them:

"Hydro power is the Northwest's greatest natural resource and should be developed in an orderly manner for the greatest benefit to the greatest number of its people.

"Operating utilities, being the nearest to the people, should have the first call on available electric power. . . .

"At present we get funds for new plants by such beside-the-point arguments as flood control, irrigation projects, national defense and the great threat of a power crisis. These are unsound from a utility viewpoint. . . .

"There should be no export of power to areas outside the region except under conditions we know will be to the region's advantage.

"Electric revenues must be used only for the construction, operation, maintenance and expansion of electric facilities. There should not be diversion of revenues to subsidize irrigation or other unrelated uses.

"We must find a field in which private and public power can live together. Many communities wish to continue receiving service from private companies."

Mr. Northrup will find many who will agree with him. The predominant issue facing America is Big Government. And Big Government is reflected in big and monopolistic agencies, which more and more dominate different phases of the economy. Government power is in that category now. For further proof read what Henry Sargent says about it elsewhere in this issue.

Change the Climate

AN unsatisfactory and forbidding regulatory climate is unhealthy for utilities and for the whole regulatory process as well. In California and in some other Western states the regulatory climate has been deteriorating badly in recent months. Result is that utilities have been increasingly critical of the commissions and the latter have reacted in like fashion. Finally, a popular opinion has developed in utility and financial circles across the nation to the effect that "Western commissions are tough and are getting tougher."

This is a serious and dangerous situation. If corrective measures are not applied quickly, it can react adversely for the utilities and for the public whose interests the commissions serve. Already the rating of some Western utility securities has been written down, and should the credit standing of many of the companies be similarly affected, the whole expansion program for serving this dynamically growing area would be jeopardized.

Today's inflationary economy, especially in rapidly expanding and growing regions such as the West Coast, poses problems and creates tensions for utilities and commissions alike. Labor, price and tax increases beset the utilities. Staff shortages and overloaded calendars create time lags in the functioning of the commissions. Finally the number of interested parties to every rate case continues to increase and the public relations problem of the utilities is intensified. Combine these and the reasons for the increasingly poor regulatory climate are apparent.

There are ways and means for relieving the situation. Simplified presentation of cases, better timing, a realistic approach to the public relations involved, more informal

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proceedings—all these will help. Sound regulation is the safeguard of the private utility system. Utilities and commissions might bear that in mind.

Sell or Subsidize

HOME building in the Far West is once again booming along at the highest rate in history. New people, new industries and new businesses help to account for upsurge. All of which augurs well for the electrical industry but for one serious exception. The wiring in most of these new dwellings stinks. It is woefully inadequate in terms of today's modern electrical usages. It is even more inadequate in the light of the appliances and usages that are promised for the future.

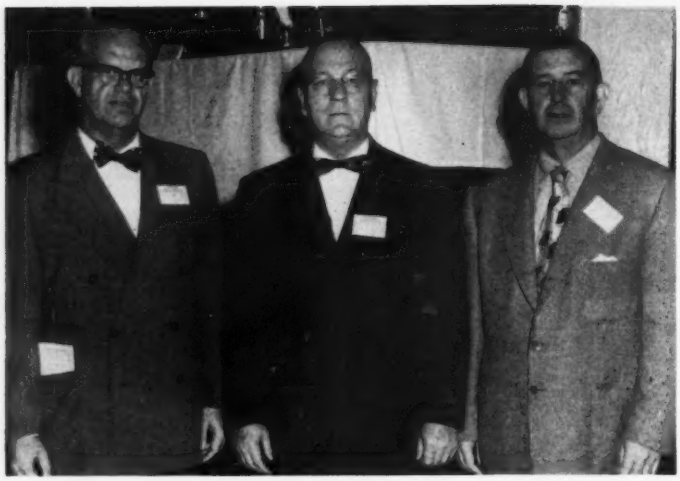
The millions of poorly wired homes that are now being added to a huge backlog of already badly wired houses has led one leader in league and association work to remark: "We'd better sell now or we will have to subsidize later." He observed that apparently no individual group or branch of the electrical industry has the time, the inclination or the interest to do anything about today's wiring problems.

Power companies are struggling with expansion programs and material and equipment shortages. Manufacturers worry about new models, where to get steel and how to combat competition. Distributors are beset by either shortages or bulging warehouses. Dealers and contractors have their own pressing problems. Yet each and every one, in the last analysis, would not exist were it not for the wiring on the customer's premises that makes their services or equipment or devices necessary and usable.

Yet each branch knows and appreciates that adequate wiring can be sold. At times each has carried a portion of the selling burden and cooperatively all have worked through leagues to get the job done in the past. Somebody ought to take time out now to reappraise the situation and to do something about it. A little selling now will be much more profitable and a lot less painful than a lot of subsidy later.

You Can Say That Again

TO seek perfection in all things is an old American custom. As a nation, we are constantly looking for flaws in our institutions and our works; and our determination always to find something better is one of the greatest sources of our strength. It is also a source of weakness, however, because—in our impatience to achieve perfection—we frequently become so engrossed in the contemplation of our faults that we lose all sense of perspective and proportion. Finding a flea on the back of an elephant, we are inclined to become so intent upon killing the flea that we often lose sight of the elephant completely. And sometimes we are even prone to forget that—no matter how desirable the death of the flea may be—it is never wise, in such cases, to shoot him with an elephant gun! Now don't misunderstand me. To improve the processes and the products of industry as we do year after year, and to neglect to improve our enterprise system in the same way, would be the blindest kind of folly. But reform and improvement are two vastly different things. One represents the elephant-gun approach, while the improvement of any mechanism — economic or industrial — can be accomplished only by those who know how to protect it from harm—men who possess the intimate knowledge of its structure and a thorough understanding of the operation of its parts. So it seems to me that the greatest contribution which anyone can make to American business today is to encourage a wider and more sympathetic public understanding of it, especially among those gentlemen in Washington who control, to such a large extent, the economic forces which govern business operations.—Benjamin F. Fairless, president, United States Steel Corporation.



Thomas Hessler Scott

Distributors' Difficulties

More than 300 members and guests of the Pacific Zone of the National Association of Electrical Distributors gathered at Coronado, Calif., Oct. 6, 7 and 8 for the zone's semiannual convention. This was the largest attendance ever recorded at a Pacific Zone meeting, and except for visits of the NAED Board of Directors, it included the largest number of visitors from wholesaling and manufacturing concerns east of the Rockies.

During the business meetings over the three days, emphasis for the supplies distributors was placed on materials supply, government controls, and the problem relating to business operations under today's economy. In the session devoted to appliance distribution, attention was given to the return of fair trade laws, the development of television markets, and the market potentials in the newer fields of home laundry equipment and air cooling.

Following the opening of the convention by Chairman Nelson R. Thomas, the members and guests heard an address by B. A. Graham, president of Sunbeam Corp., in which he outlined the progress and problems of the fair trade laws as they related particularly to appliances.

Charles E. Porter, CPA, presented a major address at the second business session in which he covered in detail the comparison between operation of a business as a partnership or proprietorship and that as a corporation. Of particular interest to the middle and smaller size distributor concerns was his analysis of the effect of taxes on each type of organization. In general, he said, ". . . the tax burden as a corporation will, in most cases, be 5% to 40% higher than as a partnership, because dividends are taxed twice." He emphasized to the wholesalers that they should consider their method of organization both to secure the most efficient operation and to take advantage of tax saving possibilities. In relation to the financing of their operations, Porter said that the important factors are:

(1) Adequate accounting records and accurate, timely financial reports to provide management with the proper tools; (2) an intelligent use of the information provided by the financial reports as well as a proper employment of the capital of the enterprise; (3) keeping your banker well informed. The closest cooperation with your bank is recommended.

One of the electrical industry's most outstanding efforts to unify in an effort to carry the message of adequate wiring and full electrical living to the consumer was outlined to the NAED conference by C. J. Bunce, coordinator of the electrical contractors' division of the Bureau of Home Appliances of San Diego County. The program, instituted by local electrical supplies distributors, and developed through cooperation of the utility, the contractors and the bureau, was outlined by Bunce essentially as it has been reported in ELECTRICAL WEST. Bunce described both the development of the program and the methods of going after the ultimate consumer through use of direct mail, posters, radio spots, displays at the annual home shows and finally through twice weekly television programs.

"Today's Credit Situation" was covered during the opening meeting in an address by Roy Worth of the Electric Corp. of Calif., Los Angeles. In a down-to-earth analysis of the value and importance of the credit man to the wholesale organization, Worth said that there were four important points that management should consider in relation to their credit operation:

"(1) Losses will be with honest customers." Worth made the point that the dishonest buyer was rare and easy to note in advance. The honest buyer has a clean record, good references, etc., but through bad judgment or bad advice he over buys or takes jobs beyond his capacity. Eventually he is the biggest credit problem.

"(2) Lack of ability and experience rank high as reasons for failure.

"(3) Dishonesty is far down the list as a reason for your losses.

"(4) Work is the greatest antidote as a preventive of losses." Worth went into detail on the desirable relationship between the credit manager and wholesale management, as well as the importance of the credit manager as a man with a knowledge of sales as well.

In the second afternoon's session, devoted to the appliance and television market, program chairmen L. E. Starkweather and R. B. Cox presented Walter Hagedohm, Los Angeles architect, who discussed "Designing the Southern California Home for Appliance Convenience."

He was followed by M. D. Durham, West Coast manager, Mullins Mfg. Co., San Francisco, with a talk on "Mrs. America Wants a Modern Kitchen," in which he stated that modern in this case means "fresh, late, new, novel and recent," not radical or surrealistic. "The kitchen has graduated from a messy workshop into one of the friendliest and one of the most attractive rooms in the house," he stated, ". . . it is both practical and pleasing to the eye." In looking at the market potential for modern kitchens, Durham noted that there are 30 million kitchens in the country over 10 years old. Each year, 1.5 million must

be remodeled. In addition, there are about one million new kitchens being built each year.

What does Mrs. America want in her modern kitchen? asked Durham. Certain facts are self-evident, he said.

(1) She wants quality workmanship by specialists; (2) she wants good construction on cabinets with sound deadening drawers, doors like those on her refrigerator, and no sharp corners; (3) she wants color, not just white, but colors that go with the walls, curtains and floor covering; (4) adequate work surface is a must; (5) a kitchen that is easy to clean; (6) she wants a functional kitchen; (7) she wants a steel kitchen, according to surveys.

Discussing the home laundry market, with emphasis on dryers, Robert H. Cockfield, Department of Water & Power, City of Los Angeles, showed that 6.2% of the national output of dryers is being sold in southern California, compared to a 4.5% average for other appliances. Using slides he showed the promotional activities of the three major utilities in that area as they developed dryer campaigns. He reported to the wholesalers that a survey of the market by his department's men showed that the following problems faced dryer merchandising: "(1) Dealers are not pushing the dryer business; (2) electric dealers are selling electric dryers—gas dealers selling gas dryers—combination dealers are selling gas dryers three to one over electric; (3) customers are not particularly conscious of operating costs . . .; while the complexity and the cost of installing electric dryers is the greatest single deterrent to sales, the dealers are not helping to make this problem easier for the customers; (5) although 95% of all dryers are sold to owners of automatic washers, dealers are not following up automatic washer sales to get dryer business."

The sale of air conditioning equipment is opening up new fields for the electric industry, according to George H. Wessler Jr., Carrier Corp., who stated that the next step in the air conditioning picture would be the sales of 2-hp and larger packaged air conditioners by the wholesalers who now handle kitchen and laundry equipment.

Relation of electrical distributors to the defense program, particularly in regard to the NPA, was described to the final session of the NAED Pacific Zone Convention by Nelson A. Miller, director of the distribution and services section, Office of Civilian Requirements, NPA, Washington, D. C. The need for continued cooperation was stressed as Miller said that: "The military production mobilization program has caused actions that will have to be reckoned with for a long time . . . defense production activities are scheduled to be on the upgrade through the first half of 1953 when, if all goes well, we might anticipate having reached a reasonable plateau of defense production which can be continued on that basis without any disruption to normal civilian production and distribution . . ." Miller anticipated that major CMP controls on copper, aluminum and steel may be expected to be dropped by July 1, 1953.

The problem in television today, said W. J. Halligan, president of Hallicrafters Co., Chicago, is ". . . not the lack of a growing market, but how intelligently to reach that market to the mutual profit of the manufacturer, distributor and dealer, and to visualize and recognize the great benefits that will accrue to the buying public once sound practices are established in the matter of pricing, selling, financing, installation, and service . . ."

Problems facing manufacturers who own distributorships or retail outlets if they attempt to establish fair trading of their products, was brought up by Lowell Mason, member of the Federal Trade Commission, in his featured address to the closing session at Coronado. In the same speech, Mason pointed out the danger of outlawing functional discounts to large users of merchandise, as is outlawed in effect today by the Robinson-Patman Act. He contended that striking out functional discounts hits at the incentive system for distributors and retailers.

Closing the meeting, the Pacific Zone wholesalers had as guest speaker George F. Hessler, president of NAED and vice-president of Graybar Electric Co. Inc. Hessler spoke on the "Road Ahead" presenting an optimistic picture based on evidence that the industry is planning ahead with the knowledge that normal business will have its periods of upswing and letdown without disaster in either case.

Arrangements for the fall convention were chairmanned by E. C. Phillips, Coast Electric Supply, San Diego. Program chairmen for the apparatus and supplies division were Fred G. Goss and S. W. Scott; for the appliance division, L. E. Starkweather and R. B. Cox. Zone Secretary R. A. Balzari coordinated the activities. S. W. Scott, Graybar Electric Co., Los Angeles, was elected to be chairman of the Pacific Zone of the NAED for the coming year, succeeding Nelson R. Thomas. The next meeting is scheduled for the Huntington Hotel, Pasadena, in the spring of 1953.

PCEA Panorama

This year the Business Development Section has a new program that promises to make its work more effective and to reach more PCEA members than ever before.

Under the direction of Chairman Vern Redman, the section will hold a number of meetings at strategic locations instead of just one territory-wide conference, as before. Scheduled for February and March, the meetings will be held in Reno, Phoenix, San Diego, San Bernardino, Long Beach, Visalia or Fresno, Santa Cruz and Stockton. Each meeting will be tailored in subject matter and highlights to fit the locality in which it is held.

All discussion groups and committees of the Business Development Section have been holding meetings and preparing material for the program, and on Jan. 23 the section's guidance committee will meet in San Francisco for a dry run of the entire show before it is put on the road.

Other committees and sections have not been idle. The advertising and publicity committee met Oct. 23. On Nov. 7 the Guidance Committee of the Engineering and Operating Section will meet in Los Angeles to review the program for its conference in Long Beach March 5 and 6.

The Administrative Services Section, as in previous years, will meet jointly with the Pacific Coast Gas Assn. Four of the eight Administrative Services groups will meet at Fresno Nov. 19 and 20, and the other four groups will have their joint meeting with the Gas association in Phoenix April 8 and 9.

Of particular interest throughout the industry will be the PCEA sponsored meetings to be held Dec. 3 in Los Angeles and Dec. 9 in San Francisco. They will feature speakers from NEMA who will discuss current-carrying capacities of wire and cables, in an effort to help resolve variances between the National Electrical Code and the California Electrical Safety Orders.

The annual convention will probably be held at Hoberg's resort in Lake County, north of San Francisco, May 13-15, 1953, featuring informal meetings, outdoor barbecue and show. Three other nearby resorts, Forest Grove, Zieglers and Adams will take care of overflow accommodations for the convention.

NECA Convention Talks Business

but ducks welfare

Dues exemption on jobs of $400,000 a year and over, welfare plans, general contractor-IO Agreements and a $175,000 business development program of national advertising were the main issues discussed at the 51st anniversary convention of National Electrical Contractors Assn., held at Morrison Hotel, Chicago, Oct. 7-9, to which some 85 Westerners were delegates. In the two vice-presidential elections there was no contest and Edgar L. Buttner, Scott-Buttner Electric Co., Oakland, was unanimously elected vice-president for District 6 and Charles H. Simpson, Cheyenne, vice-president for District 8. E. B. deFeyter, Power City Electric Co. of Spokane, was elected labor relations committeeman for District 6, a post formerly held by Buttner. For District 8 Simpson holds both posts.

Most hotly contested issue was that of exempting dues on huge projects. Many large traveling contractors doing this type of work maintain that their percentage of markup is so low they can not afford the one-quarter of one per cent national dues. For the past several years this issue has threatened to split the eastern large chapters from NECA. A compromise was voted at this convention to exempt jobs of $400,000 a year or over, in order to retain these memberships.

Dan Tracy, president of IBEW, defended the Council for Industrial Relations in the electrical contracting industry in the 36 cases heard by it during the past year. He spoke of cooperation in apprenticeship training and in the pension plan. He said IBEW was supporting Senate Bill 2907 to protect contractors from general contractors on government projects but urged the selling of the services of the specialty contractor more thoroughly. He implied that Stevenson would be more inclined to change the Taft-Hartley Act. On IO Agreements with general contractors he said the union had canceled three during the year and had signed up no new ones. But he warned of "stooges" among electrical contractors operating for general contractors.

Some of the Westerners at the NECA convention—Top: E. B. DeFeyter, Spokane, new Dist. 6 labor relations committeeman; E. R. Cornish, NECA education director, formerly Oakland; R. Goold, Stockton; John Schetky, Portland. Next: Wilkinson, Spokane manager; Bill Welsh, Sacramento manager; Mrs. Welsh; Ed Buttner, new Dist. 6 vice-president, Oakland. Next: Herb Evans and Lew Barth, both of Los Angeles. Next to bottom: Charles Meagher and Mrs. Meagher, Seattle; John Majerus, Puget Sound manager, with Mrs. Majerus; Bill Varley, San Francisco manager. Bottom: F. W. Fitch, Cheyenne; Keith Wilson, Colorado Springs, Rocky Mt. Chapter

On welfare plans the national association contended that there were too many state laws involved and that anything done would have to be done on a state basis. Both the California conference of NECA chapters and the Northwest conference, as well as a District 6 meeting held during the convention, discussed welfare plans and felt a need for coordinating information in the Western part of the United States. The California conference appointed a committee headed by Warren Penn of Los Angeles to study such plans and to make a report.

Senator Kilgore addressed the convention, deploring two trends in government contracting, namely, (1) cost plus fixed fee contractors and (2) unscrupulous bid peddling which discourages good contractors from doing government work. He expressed support for S. B. 2907 when it is reintroduced at the next Congress.

The business promotion program contemplates a full-page advertisement in *Fortune, Business Week* and *Wall Street Journal,* together with local advertising to build the prestige of qualified electrical contractors.

Chapter Elects

Rocky Mountain Chapter of National Electrical Contractors Assn. elected Simon Halle of Colorado Springs its president for the next fiscal year and recommended C. H. Simpson, Cheyenne, as District 8 vice-president. J. E. Collier of Denver was elected the chapter governor. Other officers elected were Lawrence Rider, Denver chairman and vice-president; J. W. Holt, Boulder chairman and board member; James Berwick, Colorado Springs chairman and board member; Charles Trent, Pueblo chairman and board member; Frank Kading, Casper chairman and board member; F. W. Fitch, Cheyenne chairman and board member; Charles Pope, Laramie chairman and board member; Harald Larsen, Denver, chapter treasurer; N. R. Mendenhall, Denver, secretary; E. S. Hawkins Sr., Denver, sergeant-at-arms; and additional board members are Walter Neill, E. A. Pearson, D. D. Sturgeon, Bert Stiles, E. E. Snowden and Dale Strohminger, past-president, ex officio member. Don Larson is chapter manager.

Conferring are: F. V. Frey, Pasadena; Clifford E. Plummer, Modesto Irrigation District; Lauren W. Grayson, Glendale; Paul Beerman, San Diego; Glen A. Baxter, Alameda

Business Conditions Interest CMUA

"Although the peak may not be as high as estimated, defense spending will continue through '53 and '54 and contribute importantly to high business activity," said Charles C. Leigh of Merrill, Lynch, Pierce, Fenner and Beane speaking before the 20th annual convention of the California Municipal Utilities Assn., meeting at San Diego, Sept. 30 to Oct. 3. With regulations W and X removed, consumer debt is sure to climb $3 billion to $22 billion by this Christmas, in his opinion. Leigh further stated: Total construction expenditures will be $32.5 billion this year, highest on record; commercial construction will rise with availability of steel and other building materials; despite some soft spots total public construction will be an important bulwark of business activity in years to come; soft goods have had their postwar adjustment and are moving well, but will wait for the adjustment in the durable goods boom before important expansion develops.

A six-point training program for employees who devote the majority of their time working directly with consumers was outlined by E. A. Combatalode, director of public relations, Sacramento Municipal Utility District. One-hour conferences are held at weekly intervals. The program includes: (1) Presentation of the need for public relations, an outline of the utility's program and a down-to-earth discussion of basic human psychology, (2) development of the objective of maximum customer satisfaction and analysis of customers, (3) showing of film, *By Jupiter,* on the subject of getting along with others, (4) explanation of good telephone usage by a member of the local telephone company, with emphasis on getting the maximum public relations value from phone calls, (5) stress on the fact that the telephone is merely an aid to doing business with customers, including the telephone training film, *Thanks for Listening,* (6) presentation of the importance of proper vehicular usage and its effect on public relations.

In response to requests from employees not covered by the program, the district set up two one-hour sessions to discuss public relations, said Combatalode.

Discussing the electrical engineer in the new world, Everett S. Lee, editor, *General Electric Review,* had this to say regarding the outlook for the electrical industry: by 1960 power generation should rise from 370 billion kwh in 1951 to 633 billion kwh, nearly double, and installed capacity will rise from 75 million kw to 145 million kw. These are realistic forecasts based on experience and sound evaluation. Population growth will increase 10% to 171 million by 1960 and this factor alone will account for significant increases in power consumption. Innovations like the heat pump and today's New World Home are certain to have their effects on the load curves. Several of these new homes have been built on the West Coast with an average estimated consumption of nearly 24,000 kwh—more than 12 times the national average.

Just one example for industry is the machine tool field where nearly 50% of industry's machine tools are either obsolete or of outdated design. With new developments of automatic operation, higher speeds and considerably greater power, more and more machines are becoming obsolete and ready for replacement. Here is one of the most compelling opportunities for the greater application of electric power that we can see today.

But tremendous as these prospects for load growth may seem, they are actually no greater than the past growth our industry has dealt with for decades. Thus we can look to the courage and ingenuity of our engineers in overcoming tomorrow's problems of expansion and growth just as they have done so successfully in the past.

There were several other papers of general interest or dealing with problems peculiar to municipal utilities. The usual round-table conferences on commercial and accounting, materials and procurement, operating and engineering were well attended and brought forth a profitable exchange of experiences.

At the annual business meeting Clifford Plummer was re-elected president; Lauren Grayson, vice-president; and Glen Baxter and F. V. Frey were reappointed treasurer and secretary, respectively.

A resolution opposing Proposition 10 was passed. This would not permit public funds to be spent for legislative purposes. Another resolution opposed the Central Arizona Project because of the threat it constitutes to the Colorado water supply of California and because it places a heavy tax burden on all citizens in all states.

The next conference will be held in San Francisco, the date to be decided upon later. Registration for the San Diego meeting was 153, one of the highest on record.

IES

Southern California Section heard reports of the National Technical Conference from Regional Vice-President Leonard Hobbs, Ted Shepherd, Arthur Booth and Harold Allison at its Oct. 1 meeting at which Daniel Strebel, Pacific Telephone & Telegraph Co., spoke about microwave beam transmission. William T. "Teddy" Bear gave a preview of the proposed new standards for visual recognition, supposed to replace Snellen charts, at the study club meeting presided over by Roy Bevan. Roy E. Dahlin, Southern California Edison Co., is chairman of the section.

Oregon Section heard plans from Conference Chairman Walter Potter for the 1953 Northwest Regional Conference on April 23 and 24 at its Oct. 8 meeting. K. W. Moore, Westinghouse Electric Supply Co., presented a "Lighting for Television" program. At the previous meeting, Ray W. Preston, new chairman of the section, was inaugurated by Ellsworth R. Fletcher, retiring chairman, who reported on the national conference.

British Columbia Section held its Sept. 18 meeting at the Vancouver airport and Jack Douglas of the Department of Transport spoke on airport lighting. Paul Donnelly, new chairman for the section, was inaugurated by his predecessor, B. Ashbee. A new system of center-bar lighting of high intensity for approach lighting is being installed on the new runway at Vancouver airport. At the seadrome illumination called halo lighting uses 1,000-w lamps anchored 12 ft below the surface to provide a light path on the water.

Utah Chapter heard Margaret Lines of Utah Power & Light Co. talk about and demonstrate home lighting effects, using the demonstration equipment of that company at the Oct. 16 meeting.

Northern California Section had an industrial lighting symposium for its Oct. 9 meeting held in Oakland, presided over by Robert Thunen, the new section chairman. With George Erskine, electrical engineer, as moderator, three speakers presented three phases of industrial lighting design. Richard Chard of the Bechtel Corp. refinery division spoke of some of the problems in illuminating oil refinery properties, especially in outdoor lighting. John Epperson, representative for Garcy Lighting Co., spoke of some of the problems of the manufacturer. William Major, Crouse-Hinds Co., not only described the various classes of hazardous locations and the lighting restrictions for each but demonstrated what happens in a fixture when an explosion takes place. A social event or Christmas party is planned by the section for Dec. 12.

Inspectors

Electrical Inspectors' Assn. of B. C. made a tour of inspection of the Canada Wire & Cable plant in Vancouver at its Oct. 20 meeting. Ernest Johnson was host. At the previous September meeting topics that will be presented at the annual conference in February 1953 were discussed. Among these are television, public relations and a comparison of the Canadian and U. S. national codes.

Central California Chapter, IAEI, met Nov. 1 to hear R. V. Jones of Pacific Gas and Electric Co. explain the new regulations to go into effect Jan. 1 concerning commercial and industrial installations.

Proposed changes in the National Electrical Code were the subject of the Oct. 13 meeting of the Utah Chapter with L. B. Johnson, General Electric Co., reviewing the changes. The Southern California Chapter was going to have further discussion of the proposed changes on Nov. 19, its next meeting. The Northern California Chapter had a meeting Oct. 18 at which some of the changes were discussed but will require two more meetings in November to finish the job.

Washington State Electrical Council

A meeting was held Oct. 18 in Yakima to consider the existing state law and to offer amendments to it, covering permit fees and the methods of collecting them. A legislative committee headed by Thomas S. Wildrig, Trumball Electric Co., presented the proposed amendment. Ralph T. Nielson, ways and means committee chairman and executive secretary of the Electrical Contractors Society of Washington, is raising funds to publish the proposed amendment and circulate it. C. D. Casey, Casey Electric Co., is president of the council.

NISA

Los Angeles Chapter, National Industrial Service Assn., held its election at the Oct. 14 meeting and named Earl Sweinhart, Sweinhart Electric Co., as its chairman succeeding William Hogue, Larsen-Hogue Electric Co. The vice-chairman is William Pompey, Pompey Electric Co., the secretary is Cecil Leach, Commercial Electric Co., and treasurer, Russell Lockard, Lockard Motor & Pump Co. Lloyd Mokkler of Zamboni Bros. is a fifth member for committee work. The program was an open forum on shop methods by local members.

APDA

B. P. Bengtsson, Los Angeles Department of Water & Power, was re-elected president of the Southwest area of the American Power Dispatchers Assn. Oct. 10. R. F. Davis, Southern California Edison Co., is secretary-treasurer, succeeding Cecil Frye of the same company. The area comprises central dispatchers and system operators of power utilities in California, Nevada, Arizona and New Mexico.

IAEL

Ralph R. Hubbard, manager of Rocky Mountain Electrical League, was elected president of the International Association of Electrical Leagues at its annual meeting at Minneapolis Oct. 1-4. Ray L. Halverson, manager, Intermountain Electrical Assn., Salt Lake City, was re-elected board member for Division 4. The organization also voted to bring the next annual conference to San Francisco in August 1953 at which time the Northern California Electrical Bureau will be host.

EMEA

Dates for the next spring conference of the Electrical Maintenance Engineers Assn. of Southern California have been set as March 18-20 and the organization is already making advance reservations for it. Whether there will be a show in connection with it has not yet been decided. C. Corbin Devalon, Pacific Telephone & Telegraph Co., discussed the technology of long distance telephone developments at the Oct. 15 meeting, demonstrating relays and a new automatic switching device using musical tones to put equipment in operation. At the previous meeting, the annual Bosses' Nite, a large attendance of members and their bosses heard Roger Staples lecture with the *House of Magic* for General Electric Co., and saw a demonstration of a great many new developments in electricity. It was witnessed by 204.

Electrical Maintenance Engineers Assn. of Northern California made a tour of American Can Co.'s Pacific plant in San Francisco for its Oct. 16 regular monthly meeting. The tour was arranged by Lloyd Davis, plant manager, through Ken Andem, electrical engineer. Fred Bahr resigned as secretary and Wallace Trout, San Mateo, was elected in his place.

THE MONTH IN BRIEF

Puget Power Stockholders Approve Sale

Sale of the bulk of Puget Sound Power & Light Co. properties to six Washington PUDs (EWEST, October, p 144) was approved by stockholders on Oct. 27 by more than the required two-thirds vote (1,828,781 shares, yes, 48,510, no, 11,222, unclassified). The press was barred from the stockholder's meeting and announcement of the decision was held until Oct. 30 because of a court order restraining officers, holders and others present from disclosing the vote under threat of contempt citations. The order was in response to a request by two Puget Power shareholders, whose petition for an injunction against the sale was still pending as this issue went to press.

Water Power Makes Merger Offer

Back of the injunction request was a proposal by Washington Water Power Co. to merge the two companies. This offer, made following an Oct. 8 director's meeting, gave stockholders two alternatives: two shares of Water Power common for each two of Puget Power or one share of Water Power and $27.50 in cash. Puget has 2,177,879 shares outstanding, WWP, 2,342,411. Necessary funds for the merger were assured, according to WWP President Kinsey M. Robinson. In asking the injunction, the two shareholders claim that Puget's officers and directors did not give its shareholders sufficient opportunity to weigh the merits of the WWP offer.

Both Sides Air Views in Press

Last-minute interchange between opponents and proponents of the six-district offer got wide attention. Washington Water Power took advertising space to urge Puget Power stockholders to vote "No" on the PUD offer. Puget Power President McLaughlin termed the offer "suicidal" and "calamitous"; appealed for a federal investigation of what he termed attempts to "throw a monkey wrench" into the sale. WWP President Robinson denied the offer was a "last-ditch effort" to block the sale; explained the lateness of the offer resulted from the fact that distribution of Water Power stock from American Power & Light was only completed in August and some time had to elapse before the new board could reach a decision. While the Washington State Grange supported the six-district proposal, J. Scott Milne, general secretary-treasurer of the IBEW, attacked it on grounds that it is favorable to management but that employees have been given no consideration.

Firm Power Loads Ordered Cut

Continued drought in the Northwest late last month brought the expected DEPA curtailment order affecting firm power contracts. Effective Nov. 17, some 1,000 major industries using 8,000 kw or more will curtail loads 10%, to save an estimated 110,000 kw. Firm power cuts will come off the 1951 base. DEPA named J. Frank Ward, Tacoma City Light, Frank M. Warren, Portland General Electric, Dr. William A. Dittmer, Bonneville Power Administration, Marshall L. Blair, Washington Water Power, and Owen W. Hurd, Benton Rural Electric Assn., on an advisory board to coordinate the curtailment. The Northwest Power Pool anticipates an average deficit of 175,000 to 200,000 kw during the water-storage season. An estimated cut of 65,000 kw will come off aluminum reduction plant loads, trimming 2,500 tons a month from output. Twelve electro-process industries served directly by Bonneville also will feel the pinch. E. J. Dryer, deputy administrator, DEPA, said any interruptible load still on the lines must be off Nov. 1 but added that he suspected all interruptible customers already had been dropped. Utilities were ready for the order and the Pacific Northwest Utilities Conference Committee had been working with DEPA to chart details of the brownout. Industries had been warned of the impending order.

Nevada Asks for Atomic Power Plant

Proposal to locate the world's first commercial atomic power plant near Eureka, Nev., is before the Atomic Energy Commission. The plant would be at the Richmond mine, where it would supply cheap power for extraction of ores. At a U. S. Senate subcommittee hearing in Las Vegas last month, Dr. Lawrence R. Hafstad, director of reactor development for the AEC, said that the Eureka site was high on the list of possible locations; listed four factors in choosing a location: (1) price of electric power that could be sold, (2) the construction cost index, (3) availability of cooling water and (4) strategic safety in the event of enemy attack.

Contract Would Give District Control

USBR officials in Sacramento, Calif., and the directors of the El Dorado Irrigation District have agreed to terms of a contract giving control and operation of the $7 million Sly Park unit of the Central Valley Project to the irrigation district. When approved by Interior and the California Securities Commission, voters in the district will ballot on the contract.

Interior Will Not Oppose State Plan

Interior will not oppose California's plans for a $1.2 billion development of Feather River water resources, it was announced late last month.

Sandpoint Case Dismissed

An action seeking to halt the impounding of waters behind newly constructed Albeni Falls hydro dam near the border between Idaho and Washington has been dismissed by Federal Judge Chase Clark at Coeur d'Alene, Idaho. The action had been brought by the city of Sandpoint, Idaho, against the Corps of Engineers. The city alleged the rising waters had resulted in disruption of city sewage-disposal facilities.

DOWNTOWN AREA of Beaumont, Texas, now enjoys the better continuity and uniformly good voltage of a secondary network. Workmen above are installing new 500-kva G-E network unit on Tevis Street between Pine and Travis Streets.

Beaumont installs a network to handle heavy load growth

Installation of this G-E network unit illustrates only step that will be needed in future to add new distribution capacity

As today's rapidly expanding urban loads make it difficult to perpetuate radial systems, more and more electric utilities install secondary networks.

They find that, once installed, a network gives them complete flexibility for solving load growth problems —on an orderly step-by-step basis—without any re-arrangement of secondaries or service entrances.

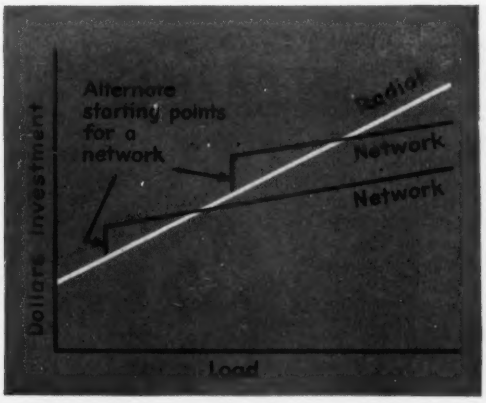
In Beaumont, Texas, for example, the Gulf States Utilities Co. found that it required extensive engineering calculations, juggling of existing loads and bolstering of circuits to meet increased loads in the downtown area. As a result it retired its radial system in favor of a network.

NO MORE LOAD GROWTH "HEADACHES". Now, when rising loads require additional capacity, all that will be necessary will be additional network units. With a network, service connections and low-voltage connections are provided initially thus eliminating any need for rearrangement or re-enforcement when a new transformer is added.

HELP FOR YOUR SYSTEM. If you, too, are struggling to accommodate new loads by perpetuating a radial system and your load density has risen to approximately 10,000 to 15,000 kva per square mile, it may be time for you to investigate the flexibility and economy of a secondary network.

For help in solving your network problems, and for complete information on the many advantages of G-E standardized network units, get in touch with your local G-E Apparatus sales office. Or write to Section 402-129 for Bulletin GEA-5024. General Electric Company, Schenectady 5, N. Y.

VAULT SIZE MINIMIZED when you install G-E standardized network equipment since both high- and low-voltage cable terminals are well below the top of the transformer. Vault depth need be only 7 feet to roof slab to provide sufficient room for maintenance and inspection.



IT PAYS TO START A NETWORK. Although the change from a radial system to a network system means some initial expense, future increases in capacity require less investment with a network. And with a growing load, the sooner the network is started, the lower the ultimate cost.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

THIS MONTH'S NEWS

Arizona Company Starts $125 Million Expansion

First step in a $125 million expansion program started by Arizona Public Service Co. is a 200,000-kw power plant located at Red Rock, 30 miles north of Tucson on the Tucson-Phoenix highway. Ground was broken on Sept. 22, with civic and business leaders attending the ceremony.

The first of two 100,000-kw generators is scheduled to go on the line in the spring of 1954 and the second unit will be in operation the following fall.

The new plant will be capable of producing nearly 25% more power than Arizona's entire share of Hoover Dam power. Cost of the initial unit will be about $14 million, according to President Henry B. Sargent.

The new Saguaro plant will be the largest outdoor-type generating installation in Arizona.

Each of the two units will have a boiler standing 150 ft high having 1,575-lb pressure at 1,005 F, and a 900,000-lb-per-hour steam flow; a 12,000-kva station service transformer which will service the generating station; and a 140,000-kva power transformer.

Second Stage Construction Bids on The Dalles Dam

Two of three firms building McNary Dam on the Columbia River, Guy F. Atkinson Co. and Ostrander Construction Co., San Francisco, are low bidders for second-stage construction of The Dalles Dam, 120 miles downstream from the McNary project site.

The Atkinson-Ostrander bid of $14,437,978 was announced Oct. 7 by Col. Thomas H. Lipscomb, Portland district army corps engineer, who noted the offer was below the government estimate of $14,707,022 for the work to be completed by Dec. 31, 1955.

Work includes a concrete spillway dam, spillway gates, a tailrace and approach channel. The spillway dam will be erected upon a rock shelf on the Washington side of the river. It will be 121 ft high and will be designed to pass 2,290,000 cu ft of water per second, more than double the highest flow ever recorded for the river in that vicinity.

Col. Lipscomb reported the corps expects to call for bids for the third phase of the construction, the $45 million power house substructure, next April. The substructure will require nearly 1 million cu yd of rock excavation and the pouring of 500,000 cu yd of cement. The power house will stand at right angles to the spillway.

Ceremonies Mark Start of Power House Construction

Work on the Albeni Falls power house, near Newport, Wash., was started with public ceremonies on Oct. 15. Highlight was the embedding in concrete of a time capsule containing a brief account of life in the 20th Century.

The $31 million project will have a capacity of 42,600 kw. The power house substructure is scheduled to be up to the spillway height by next April. First units will go on the line in August 1954 and the third generator should be in operation by May 1955.

● **The Bureau of Reclamation** has awarded contracts for electrical equipment for the Folsom power plant on the American River in California. Wolfe & Mann Mfg. Co. of Baltimore will manufacture a control board at a cost of $71,591. A contract for circuit breakers for the Folsom switchyard went to the I-T-E Circuit Breaker Co. of Philadelphia on a bid of $93,153. The Folsom hydroelectric plant is scheduled to go into operation in 1954. Completion of Folsom Dam by the Corps of Engineers and the power plant by the bureau will be simultaneous.

● **Pacific Power & Light** Co. will build a 43-mile, 66-kv line from Enterprise to Elgin in Wallowa County, Ore. It will connect with the California Pacific Utilities system and draw power produced from the Snake River developments of Idaho Power Co. New substations will be built at Enterprise and Wallowa.

California Oregon Power Asks License Revision

California Oregon Power Co. has filed an application with FPC requesting amendment of its Toketee project license to allow construction of two additional hydroelectric developments.

The $28.3 million project on the North Umpqua River in Douglas County, Ore., originally called for eight plants to generate 145,000 kw. Already completed are plants at Toketee Falls, Slide Creek and Soda Springs. Still remaining are two units at Clearwater Creek, two at Lemolo Falls, and one at Fish Creek.

Cost of the two new plants is estimated at $19,916,700. Plant one calls for a diversion dam a mile downstream at the mouth of Lake Creek. Its crest length would be 885 ft with a maximum height of 120 ft and reservoir area of 415 acres. An open conduit would extend from the dam to the forebay, with a steel penstock to the power house, which would hold a 40,000-hp turbine connected to a 29,000-kw outdoor generator. The project also calls for an outdoor substation and 132-kv single-circuit transmission line.

The second unit calls for a diversion dam 195 ft long and 25 ft high, about 500 ft below the first dam power house and below the mouth of the Warm Springs Creek. The unit includes an open conduit, steel penstock and power house with a 46,000-hp turbine, and 33,000-kw generator and outdoor substation.

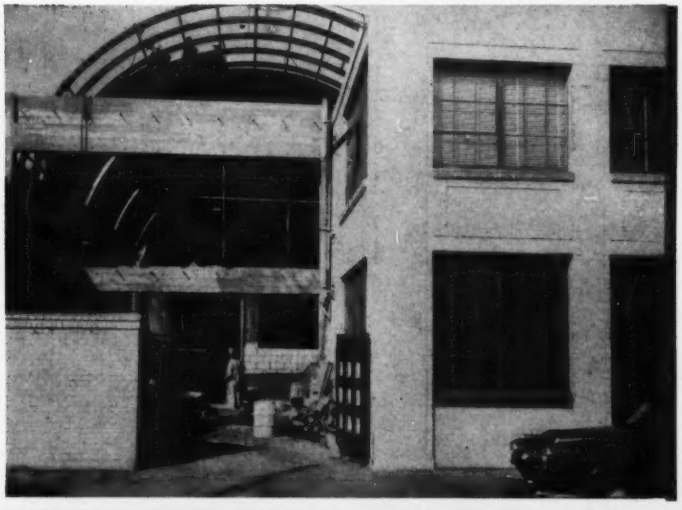
Last Bucket of Concrete Poured at Hungry Horse

Last bucket of concrete in Hungry Horse Dam was placed on Oct. 4, nearly a year ahead of schedule. The dam, on the Flathead River in northwestern Montana, was dedicated on Oct. 1, when President Truman started the first of four 71,250-kw generators. The second unit will be on the line Dec. 1 and the third and fourth generators are scheduled for August and November 1953. Work on the $103 million USBR development was started officially in July 1948.

NOW... PROMPT DELIVERY

THIS headline expresses an ambition which we are doing our best to achieve. We regret that there has been delay in shipping Gardner Transformers just as much as we appreciate the orders and your patience in waiting for delivery. It is gratifying to know that Gardner Transformers have become so widely accepted that orders consistently exceed our maximum production capacity, but we do not like to impose delay upon a customer. We are doing everything (except sacrifice one iota of quality) to speed up deliveries.

Pictured here is a new addition to our Emeryville factory which will give us 25% more production area. When new facilities and equipment have been put into operation we hope to get caught up with all back orders and thereafter to make prompt deliveries. In the meantime, thanks again for your business and your patience.



★

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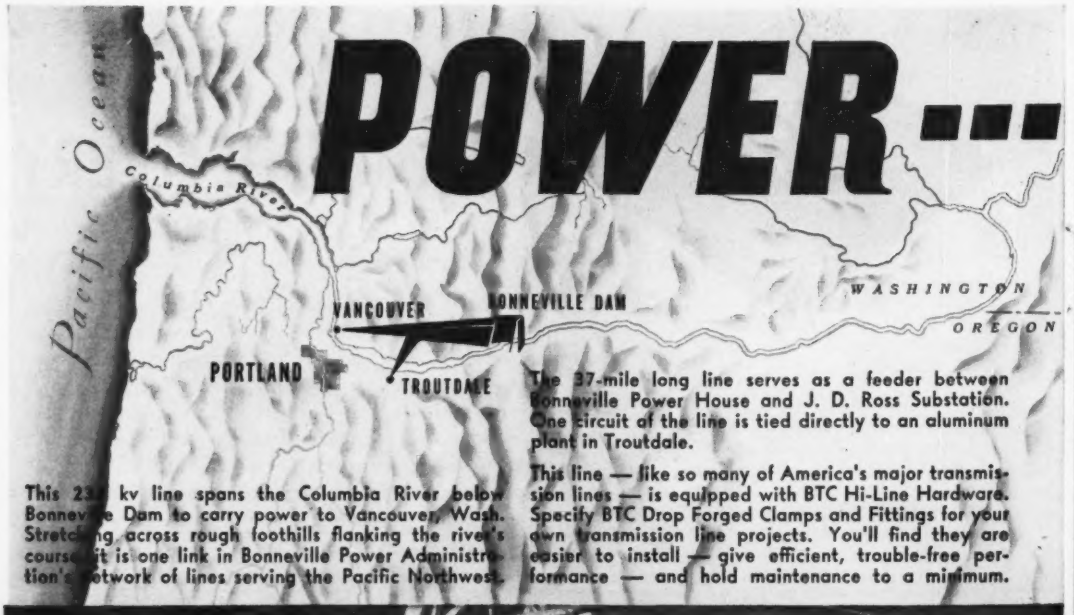
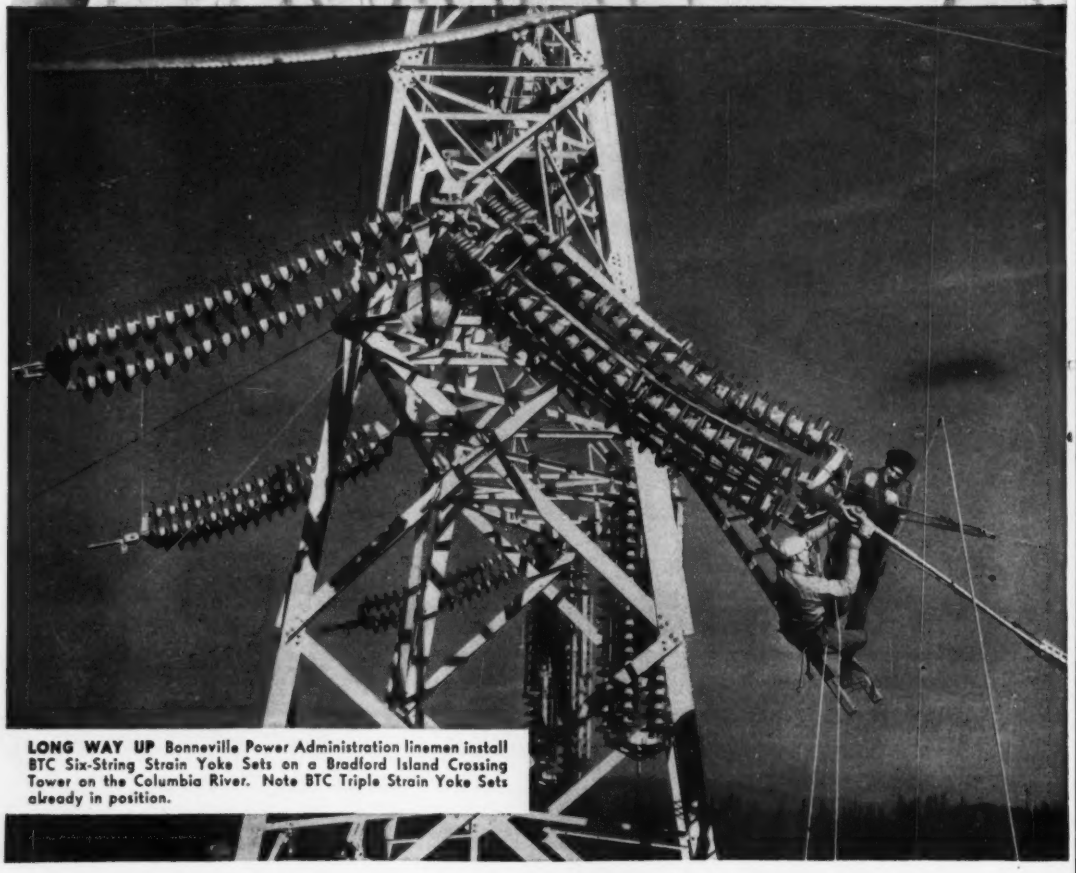
POWER...



This 23[illegible] kv line spans the Columbia River below Bonnev[illegible]e Dam to carry power to Vancouver, Wash. Stretch[illegible]ng across rough foothills flanking the river's course it is one link in Bonneville Power Administration's [illegible]etwork of lines serving the Pacific Northwest.

The 37-mile long line serves as a feeder between Bonneville Power House and J. D. Ross Substation. One circuit of the line is tied directly to an aluminum plant in Troutdale.

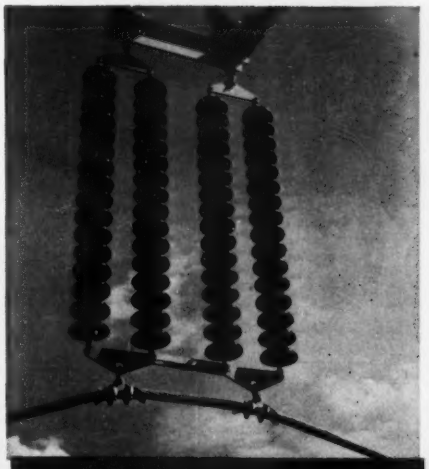
This line — like so many of America's major transmission lines — is equipped with BTC Hi-Line Hardware. Specify BTC Drop Forged Clamps and Fittings for your own transmission line projects. You'll find they are easier to install — give efficient, trouble-free performance — and hold maintenance to a minimum.



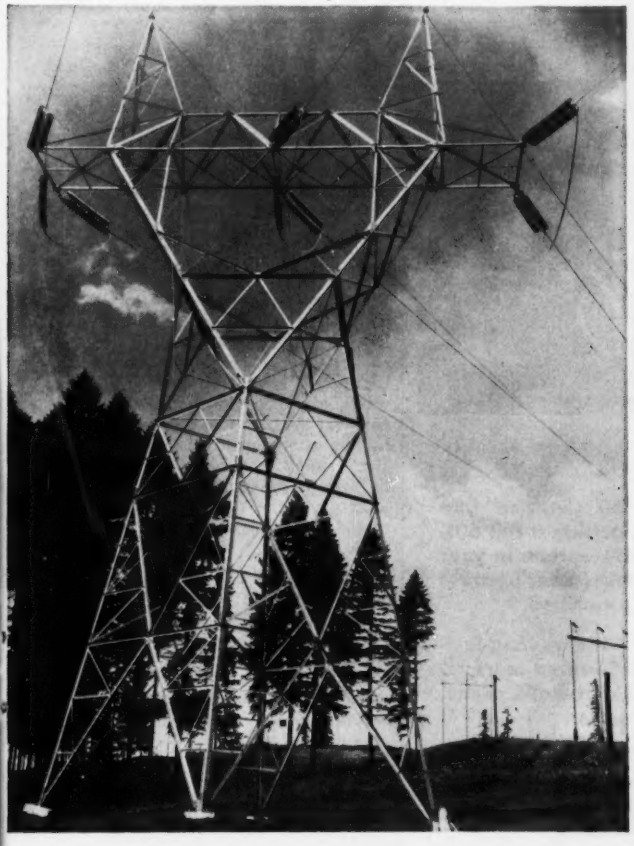
LONG WAY UP Bonneville Power Administration linemen install BTC Six-String Strain Yoke Sets on a Bradford Island Crossing Tower on the Columbia River. Note BTC Triple Strain Yoke Sets already in position.

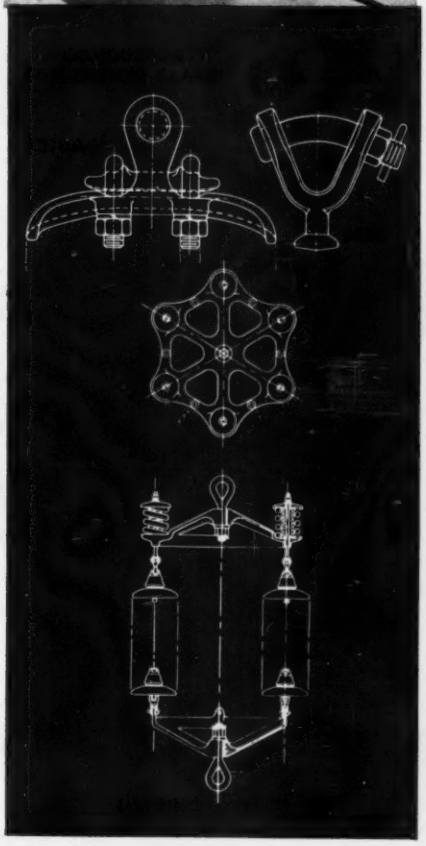
for the Pacific Northwest

BIRD'S EYE VIEW Two BTC Double Strain Yoke Sets with suspension clamps and stabilizer bar are installed on a Bradford Island Crossing Tower high above the Columbia River.



TYPICAL TOWER This single circuit angle dead-end tower is typical of those found along the 37-mile stretch between Bonneville and Vancouver. BTC Triple Strain Yoke Sets are used.





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With Bronco 60 *Certified* you *know* you are getting a full 60% *by weight* of Neoprene in your cable's protecting jacket because its contents are *certified*.

***More Neoprene* makes long-lasting Bronco 60 *Certified more resistant* to oil, acids, alkalis, ozone, gasoline, salt water.**

In addition, with Bronco 60 *Certified* you get: 1. Cold Rubber Insulation. 2. Branded Jackets. 3. Superior Flexibility.

So, BE CERTAIN, GET *CERTIFIED* — the greatest cord value on the market!

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

TACOMA LETS CONTRACT FOR UTILITIES BUILDING

A $1,205,730 contract for general construction of a $2.6 million public utilities building at Tacoma, Wash., has been awarded by the city's board of contracts and awards to the Roy T. Earley Co. of Tacoma.

The 300 x 100-ft four-story reinforced concrete structure will provide offices, an auditorium and cafeteria facilities for Tacoma City Light units now scattered in many locations through the city, as well as offices for other utilities.

In addition to the main administration building, there will be a single service building for field crew headquarters, electrical shops and maintenance facilities, to be built under a later contract. A general warehouse will house range repair and service while a three-story garage, to be constructed later, will house the Light division's automotive equipment.

● **Jefferson County PUD** of Port Townsend, Wash., one of the six PUDs involved in the proposed purchase of the Puget Sound Power & Light Co., is looking for office and warehouse space in Port Townsend. Many of the functions now performed by the company's division office at Bremerton, in Kitsap County, will have to be conducted at Port Townsend when the purchase is consummated, according to Wesley J. Martin, PUD chairman.

● **Pacific County PUD** No. 2 of South Bend, Wash., has set up a proposed budget of $1,038,500 for 1953, with $461,117 of the total earmarked for capital investment in new equipment and materials. Salaries and wages will account for $255,000; operation and maintenance purposes, $202,363; bond interest and redemption, $100,019. Estimated revenue from sales is expected to reach $680,000 while $350,000 is being carried forward from 1952.

● **Tucson Gas, Electric, Light & Power Co.** is putting power lines underground in the Tucson business district under provisions of a franchise agreement between the power company and the city. According to Mayor Fred Emery, "county as well as city residents and tourists will benefit from and enjoy greater protection by this cooperative action between the city of Tucson and a privately owned and operated utility which serves the area."

Of Special Interest to Utility SALES Staffs!

Plan to Enter the Competitions for the

George A. Hughes Awards of 1952

Your company may be having unusual success with a sales idea or a promotion plan that is solving a major appliance merchandising problem in your area. Why not give it a chance to gain recognition for you or your company in the 1952 George A. Hughes Awards Competitions? Prizes are to be awarded in the following fields of activity:

- **Electric Kitchen Promotion**
- **Electric Range Promotion**
- **Electric Water Heater Promotion**
- **Electric Dishwasher Promotion**
- **Commercial Cooking Promotion**

The George A. Hughes Awards for 1952 will be based strictly on productive sales ideas. The size of your company or existing conditions will have no bearing on the award decisions. Separate prizes are to be awarded in each of the above categories and separate prizes are to be awarded both large and small companies.

Elaborately prepared entries will have no advantage over simple, documented case histories of your successful promotion programs. Plan now to enter one competition or more. The Hughes Awards brochure will give you the complete details.

The 1952 Hughes Award brochures have been mailed to operating electric utility companies. If you need additional information write to:

Edison Electric Institute
420 Lexington Avenue
New York 17, N. Y.

Hotpoint Co.

(A Division of General Electric Company)

5600 West Taylor Street • Chicago 44, Illinois

new tap changer design

KEEPS CONTACTS AUTOMATICALLY SELF-ALIGNED

FOR ANY CONDITION A TAP CHANGER runs cool with less wear and less deterioration when it meets these requirements:

1. **Contact members flexible and self-aligning.**
2. **Equal and positive contact pressure.**
3. **Magnetic forces utilized to increase contact pressure.**
4. **One single established current path per contact.**
5. **Strong wiping action to clean contact thoroughly when tap positions are changed.**

This new Allis-Chalmers tap changer combines all five of these requirements. A design like this results in improved, cooler, carbon-free operating performance.

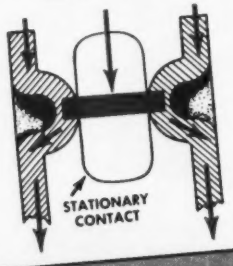
A positive flow path established under high unit pressure by a round point on a flat contact surface is the basic design principle of this new tap changer. High unit pressure promotes low contact resistance and deters heating and growth of dangerous carbon.

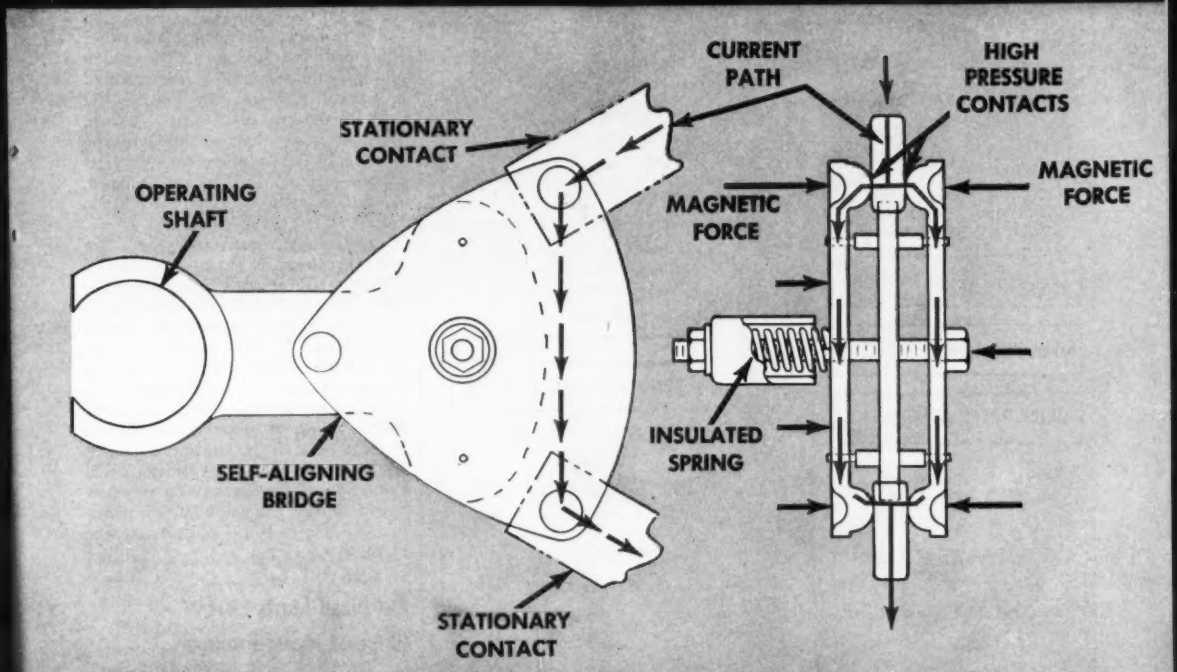
MAGNETIC FORCES UTILIZED

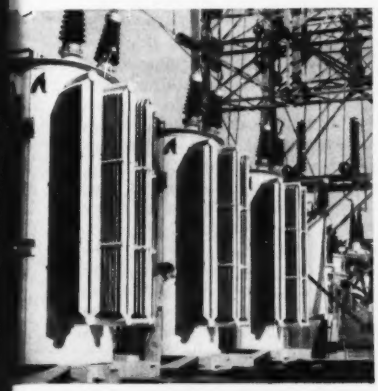
Parallel plates form movable contact bridge. Magnetic forces are set up as the result of the parallel flow of current in the bridge. These forces prevent "throw open" action when a short circuit occurs.

Get the complete story. Send for the illustrated technical sheet further explaining this new tap changer. Allis-Chalmers, Milwaukee 1, Wisconsin.

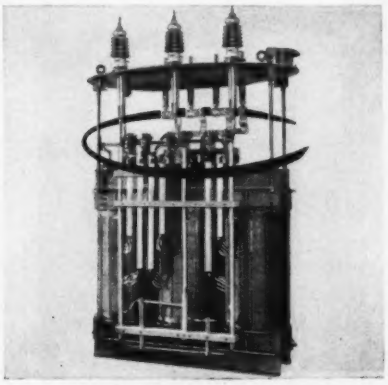
YOU CAN SEE from this diagram how the rounded point on a flat surface establishes one current path per contact. This construction assures high contact pressure. The reason is that both magnetic and applied forces are concentrated at this single point.



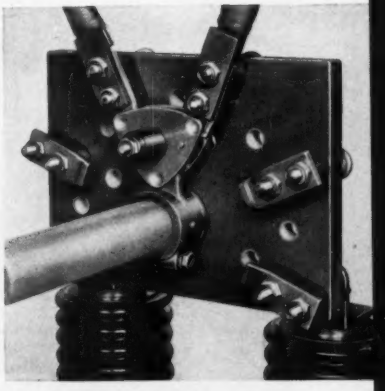




Leading utilities find this new tap changer the answer to improved tap changer performance. Flexible action maintains equal pressure and continuous alignment.



Mounted above the core and coil assembly, this new tap changer is easily inspected through the cover manholes. Tap positions are changed in all phases simultaneously.

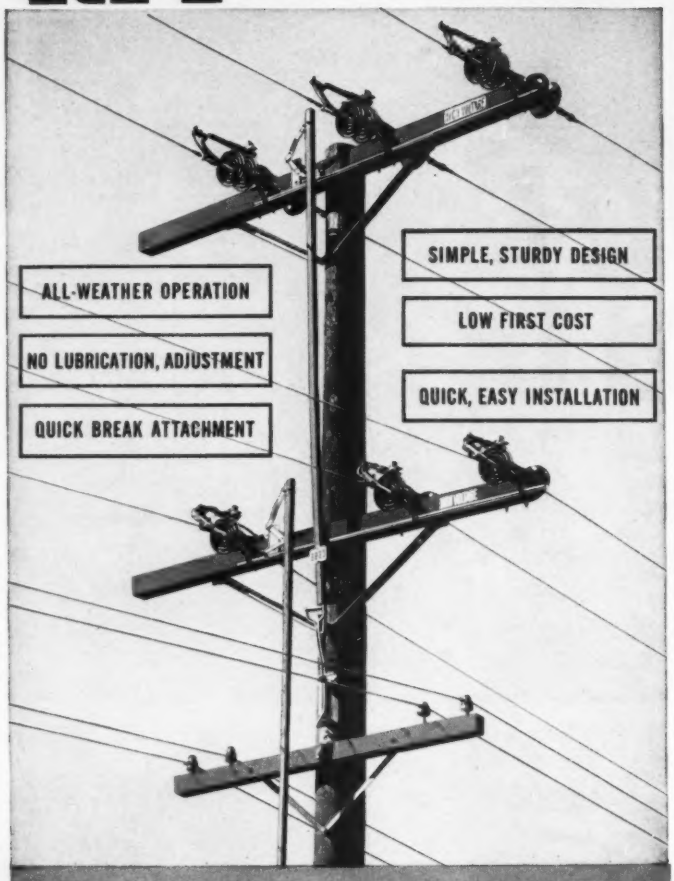


This view shows the moving contact member bridging the stationary tap lead connections. By keeping sharp edges to a minimum, engineers reduced voltage stresses.

A-3756

ALLIS-CHALMERS

KPF POLE TOP SWITCHES



MORE SWITCH FOR LESS MONEY

KPF Pole Top Switches cost less to buy and give longer service because they are simplest in design, sturdily built. They need no separate deadends, no "extra" insulators. Simple "3-step" installation saves man hours—(just bore holes in cross-arms, tighten bolts, attach connectors). Insulator stacks easily adjusted for line sag. Free-floating, self-aligning, silver-surfaced blades always maintain proper contact. Vertical, horizontal or triangular mounting. Write today for Catalog, details of KPF switches.

KPF ELECTRIC COMPANY
1624 E. Alpine Avenue • Stockton 5, Calif.

CITY OF CENTRALIA PLANS POWER PLANT EXPANSION

Bids for a 6,250-kva generator, a 7,500-hp hydraulic turbine and other equipment required in a $1.5 million power plant expansion are expected to be called before the end of the year by the city of Centralia, Wash.

The existing plant was built by the city in 1930 but in recent years its capacity has fallen below demand, necessitating purchase of power up to half the city's needs.

The project, plans for which are being prepared by the Seattle firm of Carey & Kramer, consulting engineers, involves additions to the dam and headworks on the Nisqually River about 27 miles from Centralia. A nine-mile canal from the river to the power plant will be dredged while the concrete forebay above the plant will be enlarged to serve the existing generators and the additional units. An 84 in. diameter steel penstock will extend from the forebay to the new power house while a 69,000-v transmission line will be built from the plant to Centralia.

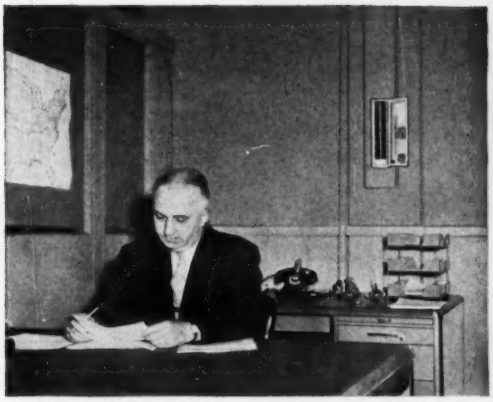
Ketchikan Starts First Phase of Hydro Program

Bids for the first phase of a $1.6 million hydroelectric expansion program were called by the City of Ketchikan, Alaska, for Nov. 10.

The program calls for expansion of the city's Beaver Falls hydroelectric plant 8 miles east of the city on George Inlet. The first phase involves the construction of a 7x8-ft rectangular pressure tunnel some 4,500 ft long, as well as clearing for a penstock line, constructing about 4,000 ft of 2.3-kv feeder line, a wharf and barge grid.

Bids will be called later for construction of the power house and the furnishing of water wheels, generators and other necessary equipment. The program calls for adding two 2,500-kw generating units to the new 1,200-kw units now in use, according to William D. Shannon of Seattle, consulting engineer for the project.

● **Anchorage,** Alaska, city council has accepted bids for equipment to be installed in the city's new $3 million steam generating plant. Westinghouse Electric Corp. will provide a turbine generator for $310,000, P. S. Lord a boiler for $354,000 and condensers for $50,345, and General Electric Co. a step-up transformer for $29,698.



NPB Electri-Centers blend into surroundings naturally, don't have that "electrical look." Wireway extensions replace exposed conduit pipes on wall leading from ceiling to panel cabinet. Column may be extended to floor if desired.

Slim dimensions make it easy to install NPB panels where wall space is limited or not available. They slip easily inside a standard 8" H-beam, fit snugly because of rounded corners. Front overlaps back for deep recessing.

LIGHTING PANELS CAN BE ATTRACTIVE

No maze of conduit pipes or cables leads into *these* lighting panels . . . and they cost less to put up!

BullDog NPB Electri-Centers eliminate the high expense of bending pipes to fit panel knockouts, and pulling wires down through conduit pipes. All wires, from ceiling to panels, are contained in wireway extensions. Neutral wires are attached to neutral bar in Pull Box at ceiling (or in false ceiling), eliminating individual neutral wires down to cabinet. Wiring can be inspected any time by simply removing front. Pushmatic ® circuit breakers, interchangeable from 15- to 50-amps., make NPB Electri-Centers® compact, versatile.

Use NPB Electri-Centers for any commercial or industrial surface-mounted lighting-panel installation up to 32 circuits. They get rid of "open-plumbing look" in offices, hallways, factories and shops. They may be mounted against walls, on columns, or in H-beams. Streamlined for appearance and safety; no sharp corners to snag, scrape or bump. Finished in beautiful gray enamel, or you paint to any color scheme.

Investigate NPB Pushmatic Electri-Centers now! See your nearest BullDog supplier, or write for NPB Bulletin. You'll save on installation costs.

BullDog Narrow Column (NPB) Pushmatic Electri-Centers make attractive lighting panels; give easier, lower-cost installation; eliminate unsightly conduit pipes and cables.

NPB FEATURES ARE YOUR ADVANTAGES!

- NPB's are only 6¾" wide, 6⅛" deep. Come in 16-, 24-, and 32-circuit capacities. Listed by Underwriters' for 1 ph., 3 wire, s.n., 120/240V A.C. or 3 ph., 4 wire, s.n., 120/208V A.C.
- Wireway extensions reach to ceiling or false ceiling regardless of height, or to wiring in truss-constructed buildings.
- Lightweight, easy to handle; no loose parts to misplace.
- "Open-plumbing look" eliminated with wireway extensions.
- Numbered wire retainers are attached to back of box for circuit identification. All wiring, including main lugs, can be done before interior is installed.
- Attractive, interchangeable BullDog Pushmatic Circuit Breakers make NPB Electri-Centers compact, versatile.
- All copper current-carrying parts silvered for greater conductivity.
- Sell for price of ordinary panels; much cheaper to install.

BULLDOG

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

PIONEERS IN FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS

1902-1952 . . . SERVING INDUSTRY FOR 50 YEARS WITH FINER ELECTRICAL PRODUCTS

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Coast Electric & Manufacturing Co.
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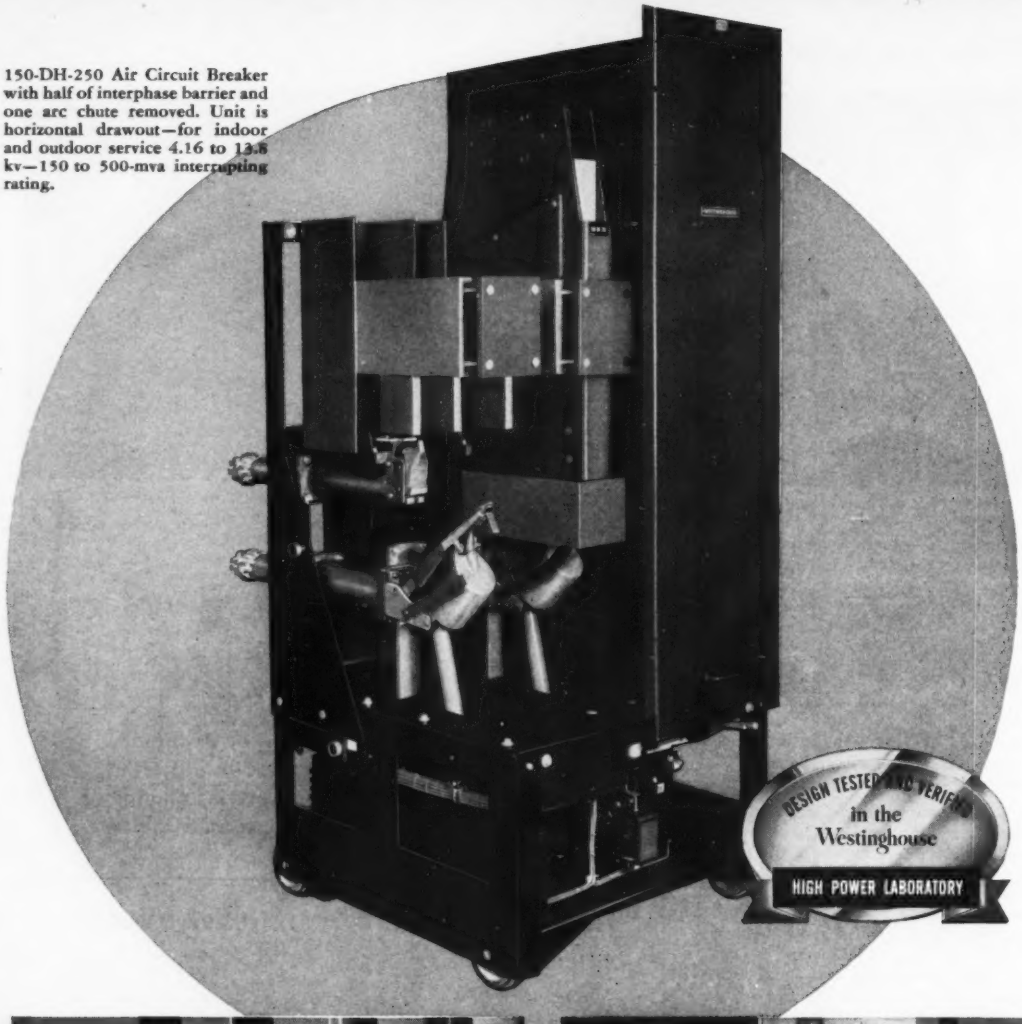
Portland 12, Oregon

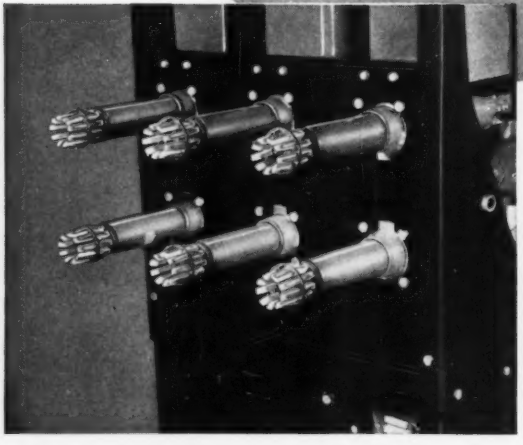
Safety Switchboard Company
1445 Stevenson St.—Tel. HEmlock 1-2470
San Francisco 3, California

Paul L. Mullenbach Co.
3008 E. Olympic Blvd.—Tel. ANgelus 9-8101
Los Angeles 23, California

Young Electric & Manufacturing Co.
2134 Curtis Street
Denver 2, Colorado

150-DH-250 Air Circuit Breaker with half of interphase barrier and one arc chute removed. Unit is horizontal drawout—for indoor and outdoor service 4.16 to 13.8 kv—150 to 500-mva interrupting rating.





Positive contact is obtained on primary disconnects by individual flat springs and heavily silvered, self-aligning, finger-like segments. Segments on breaker are easy to inspect.

Horizontal-drawout feature makes it easy to place breaker into operation. Two-surface wheels which ride on track in stationary structure assure perfect alignment for engaging contacts.

The DH De-ion® breaker design pays performance benefits

IN EVERY PHASE OF METAL-CLAD SWITCHGEAR OPERATION!

Here's how the Westinghouse DH Air Circuit Breaker for Metal-Clad Switchgear gives you the kind of performance you want . . .

Fast, positive, arc interruption . . . DH Air Circuit Breakers employ the De-ion® principle of arc interruption—the most efficient method of arc extinction in use today. The De-ion principle is a Westinghouse exclusive! The true ceramic material used in constructing the arc chutes provides unusually high resistance to heat shock.

Simple, effortless operation . . . DH Breakers are the horizontal-drawout type. No lowering or lifting is necessary. There's no complicated mechanism to require frequent inspection or maintenance. Breakers are drawn straight out from disconnected position . . . require only a few easy turns of a crank to move into operating position.

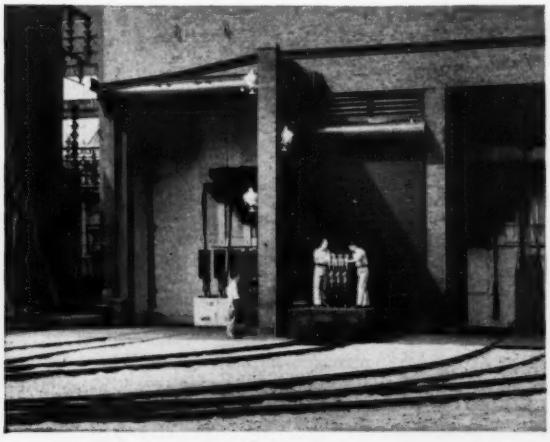
Easy inspection and maintenance . . . Breaker interphase barriers can be removed by simply loosening holding bolts. Arc chute removal—just as simple—exposes contacts at an accessible and convenient working height for quick inspection and maintenance. High-pressure, finger segments located on breaker primary disconnects further simplify maintenance.

"Long-life" construction . . . All breaker elements are secured to a rigid, all-welded steel frame. Hardened, stainless steel is used at major wearing points . . . silver-tungsten arcing contacts have high resistance to arc burning.

Perfect alignment for interchangeability . . . The use of a master breaker and a master stationary structure in manufacturing holds drawout units and stationary structures to close dimensional tolerances. Result is perfect alignment . . . easy interchangeability.

Proved operation . . . The DH Air Circuit Breaker design has been extensively tested in the Westinghouse High Power Laboratory. The results of these tests are verified by many years of satisfactory field performance on thousands of breakers.

For complete information on Westinghouse Metal-Clad Switchgear write for Booklet B-5306. Address: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60795



A DH Air Circuit Breaker is brought into a test cell in the Westinghouse High Power Laboratory to verify a new design feature under short-circuit conditions.

See "Electrical Proving Ground"

. . . the dramatic story of the Westinghouse High Power Laboratory in sound and color motion picture. For details see your Westinghouse representative, or write: Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania.

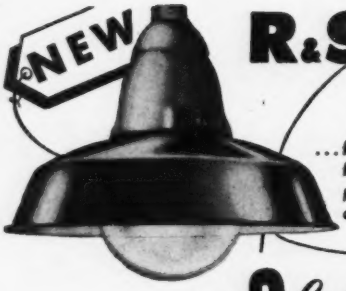
ELECTRICAL PROVING GROUND

YOU CAN BE SURE . . . IF IT'S

Westinghouse

METAL-CLAD SWITCHGEAR

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver



NEW R&S DUST-TIGHT LIGHTING FIXTURES

...for hazardous locations where flammable or explosive dusts are present. Class II, Groups E, F, G and Class III.

With 2 Exclusive Design Features

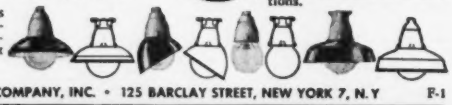
R & S Type DL Lighting Fixtures contribute outstanding advances in fixture construction and installation simplicity! They operate very cool – 'way below allowable temperatures for this type of installation.

Two *exclusive* design features, in addition to basic advantages common to other well-constructed dust-tight fixtures, assure faster, easier installation, cleaning and relamping. They're made of cast aluminum alloy – designed with streamlined simplicity – and shaped to prevent dangerous accumulation of dust particles. Write for Information Data Sheet No. 7151-10.

1 Lampholders are located within the conduit box assembly of both pendent and junction box types, permitting installation and wiring without regard to size or style of fixture.

2 All fixture – globe – Reflector assemblies fit either base and are easily attached or interchanged by means of a simple bayonet slot and screw arrangement, without disturbing electrical connections.

Pendent and Junction Box bases standard to all fixtures. They accommodate any fixture—globe—reflector assembly in 100 or 200 watt sizes.

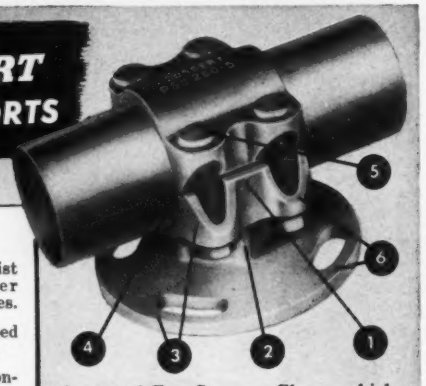


RUSSELL & STOLL COMPANY, INC. • 125 BARCLAY STREET, NEW YORK 7, N.Y. F-1

RUSSELL & STOLL

PRECISION BUILT ELECTRICAL EQUIPMENT SINCE 1903

DOSSERT BUS SUPPORTS



Type PSS

1. Designed to resist severe cantilever and impact stresses.
2. Heavy-duty, ribbed throat underbody.
3. One-piece, rigid construction.
4. Slip-fit and tight-fit by reversing cap.
5. Silicon bronze high-strength bolts . . . oval neck connector or hex head type.
6. High strength bronze alloy . . . non-magnetic . . . corrosion-resistant.

Write for Catalog 45-1B

Immediate Delivery of all standard items

A rugged Bus Support Clamp which permits rigid or slip-fit clamping on tubular bus conductors. Unique features make this clamp an outstanding support for trouble-free, enduring service.

Also available on specification with an 8-hole slotted base.

DOSSERT MFG. CORP.

249-255 HURON STREET, BROOKLYN 22, N. Y.

SINCE 1904

For use with aluminum conductors, add HSN to the catalog number.

Representative—George S. Koch Associates, 420 Market St., San Francisco

COMMISSION APPROVES COLORADO MERGER PLAN

Merger of Southern Rocky Mountain Utilities Inc. and Frontier Power Co. was approved by the Colorado Public Utilities Commission, which commented that "the surviving company will be able to not only continue to serve but should be in a better position to expand its service if necessary."

Southern plans to take over Frontier's generators in Trinidad and Walsenburg, Colo., and its distribution system in Huerfano and Las Animas Counties in Colorado and Colfax County in New Mexico.

The merger would be effected through Southern's issue of 102,000 shares of common stock and $1,140,000 worth of $10 par debentures, with Frontier stockholders offered the right to exchange their stock for debentures of Southern.

Southern also would assume the $1,560,000 of Frontier first mortgage bonds that are outstanding.

This part of the plan ran into trouble before the Colorado PUC. The John Hancock Mutual Life Insurance Co., owner of all the first mortgage bonds, objected to the merger. The PUC decided, however, that since the bonds are secured by a first mortgage on Frontier, and will continue to have preferred position after a merger, the John Hancock money is secure.

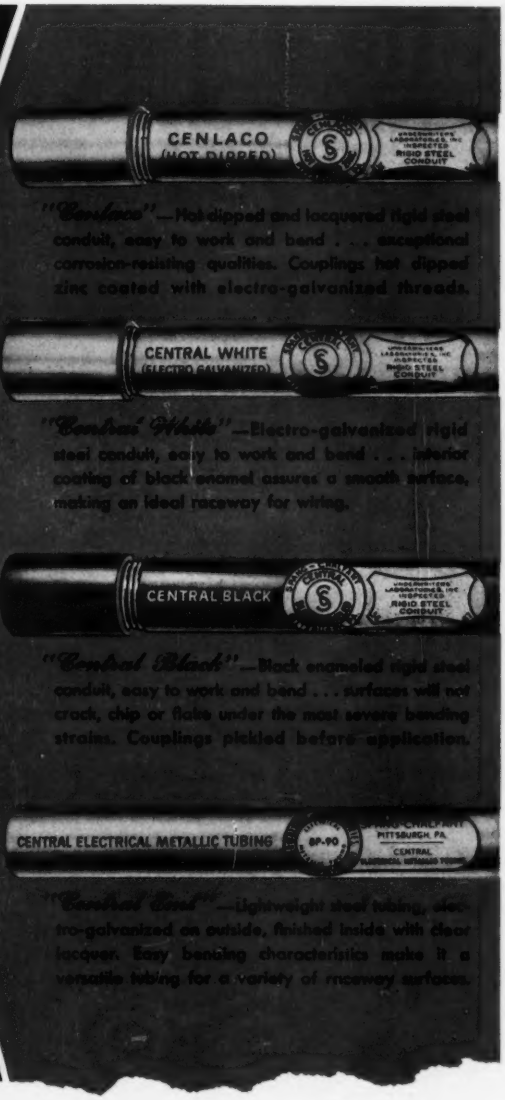
The merger has been approved by both Colorado and New Mexico, but must also be approved by the Federal Power Commission, and the securities issues must have SEC approval.

● **Proposed sale** of Big Bend Electric Cooperative properties in Franklin County to the Franklin County PUD of Pasco, Wash., may be discussed at the cooperative's annual meeting Nov. 5 in Ritzville. The cooperative has about 330 consumers on 150 miles of line, about a third of its system, in Franklin County, according to Manager Robert Klatt. Its board of trustees agreed in 1945, when the PUD was inoperative, that it would recommend sale of such lines to the PUD when such a transaction would be "practical." Harry Hudlow, PUD manager, formerly managed the Big Bend cooperative.

● **Northwest Engineering Electric** Co. of Seattle, on a bid of $148,534, sscured contract for installing 1.644 miles of lights on the new Alaskan Way Viaduct, nearing completion.

take your pick!

...you always get a better conduit when you select SPANG® CENTRAL


CENLACO
(HOT DIPPED)
RIGID STEEL CONDUIT
"Cenlaco"—Hot-dipped and lacquered rigid steel conduit, easy to work and bend . . . exceptional corrosion-resisting qualities. Couplings hot dipped zinc coated with electro-galvanized threads.
CENTRAL WHITE
(ELECTRO GALVANIZED)
RIGID STEEL CONDUIT
"Central White"—Electro-galvanized rigid steel conduit, easy to work and bend . . . interior coating of black enamel assures a smooth surface, making an ideal raceway for wiring.
CENTRAL BLACK
RIGID STEEL CONDUIT
"Central Black"—Black enameled rigid steel conduit, easy to work and bend . . . surfaces will not crack, chip or flake under the most severe bending strains. Couplings pickled before application.
CENTRAL ELECTRICAL METALLIC TUBING
EMT-90
PITTSBURGH, PA.
CENTRAL
"Central Steel"—Lightweight steel tubing, electro-galvanized on outside, finished inside with clear lacquer. Easy bending characteristics make it a versatile tubing for a variety of raceway surfaces.

Remember: For any purpose standardize on Spang Central Conduit whenever you want the utmost in dependability.

First choice of prominent architects, contractors and owners, because it's a *quality-controlled* conduit . . . made from carefully selected steel, formed under exact heat conditions, inspected constantly—manufactured to give exactly the right threading, bending and cutting characteristics. All features which will reduce your installation time and costs.

Be sure to specify the *better* conduits by Spang. You'll find it will pay!

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
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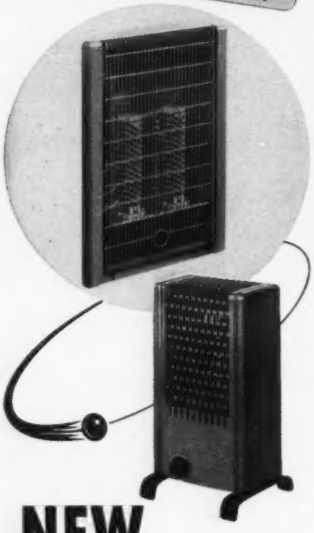
SELL
HEALTH and COMFORT
with... WESIX IONIX Wiredheat



NEW

Wesix-Ionix Wiredheat means better profits for you this heating season.

Wesix-Ionix Wiredheat destroys airborne bacteria, incinerates dust and pollen particles...actually freshens stale air by absorbing the positive charges common in urban air. Wesix-Ionix brings to the home balanced "Ion Rectified" air like that found in famous resorts, better health for the whole family.

Available built-in to both Wesix Wall Furnaces and automatic portable heaters, the new, patented Ionix feature costs nothing extra to operate, needs no maintenance or adjustment.

WESIX IONIX Wiredheat

Write your nearest Wesix office for complete information and promotional material.

WESIX ELECTRIC HEATER CO.
ROOM 91
390 FIRST ST • SAN FRANCISCO, CALIF.
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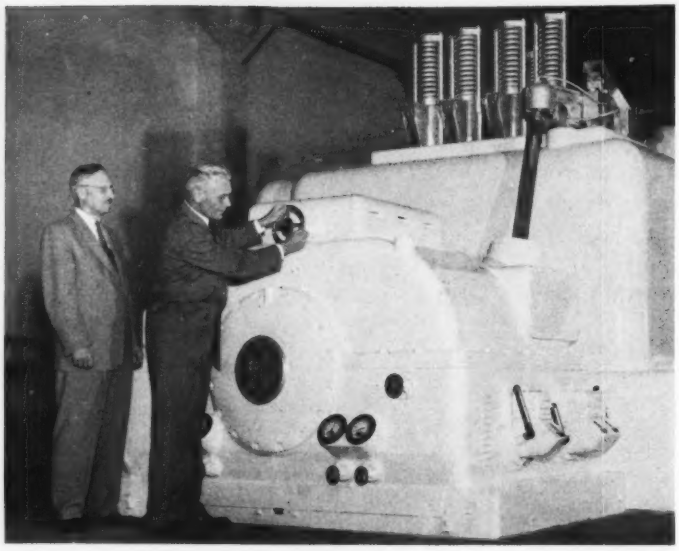

Emory Sherwin, right, president, and H. A. Noble, vice-president in charge of operations, San Diego Gas & Electric Co., look over the new 66,000-kw generator in the company's Silver Gate plant during recent ceremonies celebrating completion of the plant

Plans Made for Serving Aluminum Plant at Skagway

Hydroelectric power for a $400 million aluminum reduction plant, which the Aluminum Co. of America has announced it will build near Skagway, Alaska, will be generated by damming the Yukon River at Miles Canyon, near Whitehorse, Yukon Territory. Approval of the Canadian government must be secured.

Water from the reservoir behind the dam will be carried under mountains through two tunnels having a combined length of about 21 miles to two Alcoa power houses in the Taiya Valley. The first power house will be in a steep gorge at the upper end of the valley, at the end of a tunnel more than 13 miles long under Chilkoot Pass.

Each power house will have a capacity of about 800,000 hp, their combined output being sufficient to serve the aluminum plant and the Whitehorse community and part of the Yukon Territory. Underground construction is planned.

Plans for the plant were announced at a meeting of company executives in Mount McKinley National Park by Loren E. Hickman, vice-president and general counsel for Alcoa. Since congressional action is necessary before Alcoa can buy the 20,000 acres of land necessary for the plant and adjacent town site, work could not be started before next year, with four years required for completion.

The plant, which initially will be capable of producing 200,000 tons of aluminum annually, eventually will offer employment for about 4,000 workers, The project will include a new community of 20,000 people serving the operations.

Tucson Company Now Has 50,000 Meters in Service

Observing installation of its 50,000th meter, Tucson Gas, Electric Light & Power Co. staged a program for Mr. and Mrs. 50,000 and some 30 members of the electrical industry, the press and radio. Installation was followed by a tour of new substation construction, a luncheon and inspection of the new DeMoss-Petrie power station.

The company has doubled the number of meters in service since 1947 and has been making installations this year at the rate of one every 17 minutes for a customer growth of 12.5%.

Westinghouse supplied a goldplated meter and gifts of electrical appliances for Mr. and Mrs. 50,000. The meter also commemorated the company's 50th anniversary.

A tape recording was made of the ceremony and was broadcast later over radio stations. Picture on p 150.

Everything but the box...

AND WE EVEN ASSEMBLE THAT! Yes, all Gedney fittings are completely—entirely—produced in Gedney's own plant . . . everything under one roof!

Gedney fittings are unbreakable malleable iron—special hot dip galvanized for maximum life. *All* Gedney fittings are machined and threaded with utmost accuracy. What's more, Gedney brings you a complete line, including many improved design features that bring greater efficiency. It may well pay you to write or call for the whole Gedney story. Do it today! **You can sell Gedney fittings as the easiest and quickest to install—longest-lasting on the job.**

GEDNEY FITTINGS FIT!

GEDNEY
ELECTRIC COMPANY
GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

Newest! Safest! Best!

STRIP-O-LIGHTS

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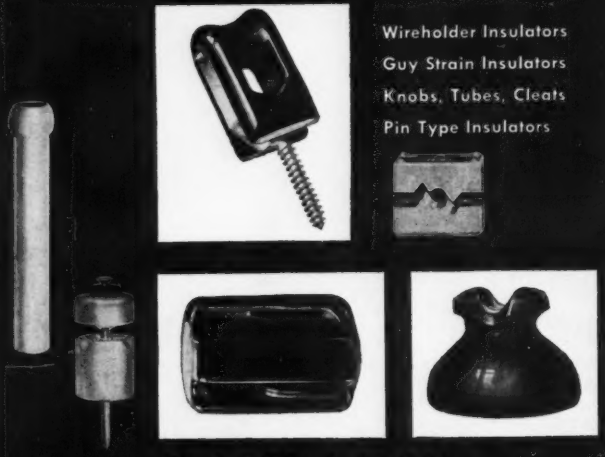

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PG AND E GRANTED RATE INCREASE BY COMMISSION

An increase in electric rates totaling $30,642,000 a year in 46 northern and central California counties was granted to Pacific Gas and Electric Co. last month by the California Public Utilities Commission.

The 16% over-all rate increase will hike the monthly electricity bills for domestic customers about 80c, effective Nov. 10.

PG and E had applied for a 22% increase, which would have brought them a gross yearly revenue of $45,704,000, but the commission reduced the amount by $12,714,000.

The commission also granted the utility permission to open negotiations of special contracts, which could add another $2,348,000, eventually boosting the total gross yearly increase to $32,990,000. Unless PG and E can renegotiate these contracts, it will have to bear the loss.

The rate change means an annual net return to PG and E of about $15 million, after payment of income and franchise taxes. The commission pointed out that almost $6.7 million of the increase was authorized because of recent wage increases and increased federal taxes.

The commission found a 5.55% return on a depreciated rate base of $976,927,000 to be adequate and reasonable. Since the company's income this year had shown a downward trend, it was allowed a 5.75% rate of return for 1952.

The commission also ordered the company to prepare within 180 days a report regarding the feasibility of establishing lower rate zones for built-up areas lying outside incorporated cities.

● **Unions representing** some 4,000 Seattle City Light employees have protested city council action in closing the 1953 budget without "true collective bargaining" on proposed wage increases. The adopted budget calls for a minimum $10-a-month wage increase for all city employees with a $15 increase in some cases. Union officials are asking for a minimum monthly increase of $25 and have implied that they would strike on Jan. 1 if new wage proposals are not made.

● **Wages** of linemen working in the heavy construction industry of the Pacific Northwest have been increased 15c an hour, following approval by the Construction Industry Stabilization Commission. The increases were retroactive to July 1.

How PROSPEROUS Is The USA?

Just how prosperous *are* the people of the United States?

The sole purpose of this message is to help clear up the confusion and controversy that surrounds this important question.

To find out how much prosperity, or material well-being, the people of the United States now enjoy, it is necessary to get answers to these questions:

1. As compared with other times, what is the total amount of goods and services that we have available for our enjoyment?

2. How great, on the average, is the share of each American in this prosperity?

3. How does our prosperity compare with that of other nations?

National Product at Peak

The government statisticians who do the bookkeeping for the nation produce a figure called the Gross National Product. It is supposed to be the total obtained when you multiply the amounts of everything we produce by the prices of everything produced. This year the GNP, as it is commonly tagged, will add up to something like $345 billion.

Since this will be the highest total that GNP has ever attained, some people will acclaim it as evidence that we now are enjoying the greatest prosperity on record.

The GNP, however, is not an accurate yardstick of prosperity. It may go up because of price inflation alone without any increase at all in the output of goods and services. Also the GNP includes very large amounts of goods and services, such as those for the military, which are in fact a result of misfortune rather than of a condition that might properly be called prosperity. Moreover, there is no deduction from the GNP to make allowance for the equipment that is worn out in producing it.

Little Recent Progress

When we make adjustments such as these — to find out how much of our production really is available for the use and enjoyment of the civilian population — the *adjusted* national product since the beginning of World War II comes out about as follows. The effects of price inflation have been removed from these figures.

YEAR	ADJUSTED NATIONAL PRODUCT	
	Billions 1951 Dollars	Index (1946 = 100)
1940	$176.2	76
1946	232.5	100
1947	240.7	104
1948	244.3	105
1949	239.7	103
1950	260.9	112
1951	267.9	115
1952	264.3	114

From this table the fact stands out that progress in raising our level of prosperity has been halting. What progress we have made came in a few dramatic increases before or after a military build-up. Aside from those, the progress has been fairly slow. This year, 1952, it has been particularly discouraging.

Again, when account is taken of the number of people who must share in the goods and services that are available, our progress is even less marked. This is shown by the following table which gives the share of the average American in the national product. This, as the table indicates, is arrived at simply by dividing the total of available goods and services by the population on hand to share in them.

YEAR	POPULATION Millions	ADJUSTED NATIONAL PRODUCT Billions 1951 Dollars	ADJUSTED NATIONAL PRODUCT Per Person
1940	132.0	$176.2	$1,335
1946	141.3	232.5	1,645
1947	144.0	240.7	1,672
1948	146.6	244.3	1,666
1949	149.2	239.7	1,607
1950	150.6	260.9	1,732
1951	154.4	267.9	1,735
1952	156.9	264.3	1,685

Here it is clear that we have made little or no headway since the end of World War II.

U.S. Compared to Other Nations

Although we are making slow progress in increasing our prosperity, as measured during recent years by the amount of goods per person, we still are by long odds the most prosperous people on earth. This can be seen from the following table. It offers a rough measure of how the adjusted output of goods and services per person in the United States compared in 1951 with that in a number of other countries:

COUNTRY	PER PERSON
United States	$1,735
Canada	1,231
United Kingdom	614
France	510

To figure more closely "How Prosperous is the U.S.A.?" we must answer a number of other questions. One of the most important will be the subject of a later editorial in this series. It is "Who Gets What?" How have various income classes and occupational groups shared the total available goods?

Another question that has a basic bearing on the quality and durability of our prosperity is "How fast are we using up irreplaceable natural resources, such as oil, iron ore, and copper, to sustain it?" Any attempt to deal with this very complicated question must also be deferred.

A Problem for the Future

In the meantime, however, key facts about our prosperity are that:

1. Most of the increase in the nation's total production in recent years has been to meet military requirements rather than to improve the American standard of living.

2. The increase in the supply of goods and services actually available for the average American has been slow and halting.

3. We Americans are still extremely well provided with the good material things of life, as compared with peoples in other lands.

These three facts bring to mind a whole series of policy questions. What can be done to speed up progress in improving our prosperity? What—to repeat the question discussed in the previous editorial in this series—can be done to make our prosperity less precarious?

Here, however, the purpose is not to prescribe. It is simply to indicate as accurately as it can be done in a brief article the actual state of the nation's prosperity.

In doing this much, it can properly be remarked that the record presents to the American economy both a problem and an opportunity of surpassing importance. It is that of building a prosperity that will be both more progressive and more secure than any we have known in recent years. In the light of what clearly remains to be done, we shall make a grave mistake if we use up any of our energy in congratulating ourselves on the relatively meager progress here recorded.

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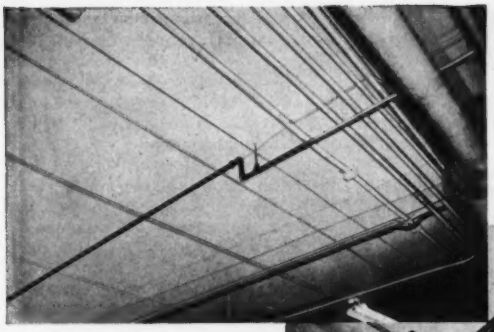

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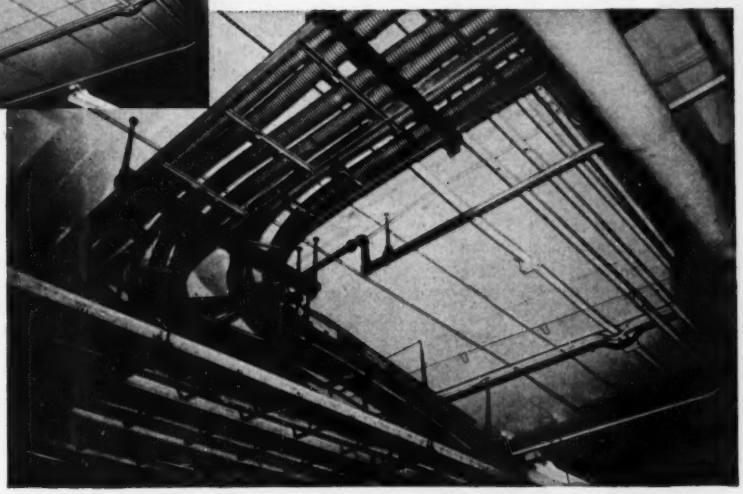

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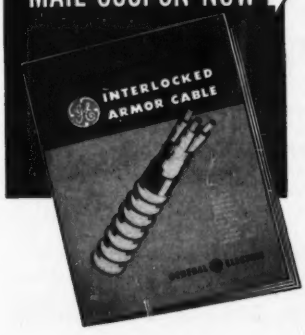

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TACOMA CUSTOMERS START NEW BILLING RECORD

Under a new Tacoma City Light program for residential and commercial customers, minimum bills for April through September next year will be based on use from now until March 31. Minimum bills in the last six months in the 1951-52 year came to an end on Sept. 30.

Less than 15,000 of Tacoma City Light's 52,000 residential and commercial customers found their summer bills affected by the 65% minimum charge based on their last winter's use. The other 37,000 used enough power during the summer months so their bills were more than the minimum charge.

"Fall and winter use of electric power for comfort and convenience without a corresponding summertime use makes the summer minimum bill necessary," said C. A. Erdahl, commissioner of public utilities. "Very few of those who enjoyed such a large winter use of power found their year-around cost to be materially higher because of the summer charge which makes winter service possible."

Tacoma City Light took newspaper advertising space to point out to its customers that "if you balance your winter and summer use—as the great majority of Tacoma Light customers do without any special effort—you can avoid a minimum bill next summer."

Official Tells BPA Plans For Helping Local Utilities

That Bonneville hopes in the near future to be able to take steps resulting in more direct assistance to local utilities in locating and financing projects similar to Pend Oreille PUD's $15 million Box Canyon Dam near Ione, Wash., was brought out by John D. Davis, assistant BPA administrator, at recent ceremonies in connection with the start of work on that project.

He said that BPA considers the Box Canyon project an object illustration of how home rule and local initiative can complement and relieve the federal government of a part of its financial burden while providing substantial benefits both to the local utility and to consumers. There are several hundred prospective small power sites in the region which are as yet undeveloped, he said.

Bonneville also proposes to recommend to the next Congress that the Bonneville Act be amended so that BPA may buy power directly on long-term contracts from locally built and owned projects or to serve as agent in the marketing of power, he stated. He added that it was recognized that the practical problem a local utility faces in building smaller projects lies in marketing the power from them to insure the bankability of the project and at the same time permitting the utility to have access to the power to meet is own requirements as they may arise in the future.

Indian Chief Asks $20,000 Damages for Flooded Lands

Chief Tommy Thompson of the Wy-am Indian tribe in Oregon has filed suit in U. S. District Court for $20,000 for damages to properties to be flooded by The Dalles Dam reservoir on the Columbia River.

Thompson's suit is the first of many expected to be filed unless agreement can be reached on Indian fishing rights. Final settlement may add hundreds of thousands of dollars to the cost of the project.

Pacific Northwest tribes have traditionally taken salmon in the Celilo Falls area, and the waters have been reserved to the tribesmen by a century-old treaty between the Indians and Congress.

● **The University of Washington** School of Fisheries will study the design of fishways for hydroelectric dams under a contract with the Corps of Engineers just approved by the university's board of regents. The contract provides an initial grant of $10,000 for a preliminary study during the next six months of the effects of dam fishways on the migration and spawning of salmon and steelhead. The school will gather background information on research that already has been done in this field and related areas, in order that a program may be outlined for a later, more detailed study.

● **Phoenix,** Ariz., has eased around the problem of outdoor advertising lighting in residential areas with adoption of a ruling that complies with county planning and zoning ordinances. The new rule allows outdoor signs provided they are not used intermittently or are of the flashing type, and the source of light must not be visible, nor interfere with the rightful use of any adjacent property. The problem arose from establishment of many small business firms and shops in county residential areas.

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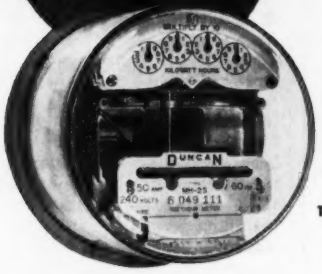

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BRANCHES & DISTRIBUTORS IN KEY WESTERN CITIES

CALIFORNIA UTILITY MAY TRY CLOUD SEEDING

Pacific Gas and Electric Co. has signed a contract with North American Weather Consultants, Pasadena, Calif., for cloud seeding over the Mokelumne and Stanislaus watersheds.

The rain making, using ground-situated smoke-generators burning a silver iodide solution, may begin by December, Dunlap D. Smalley, vice-president in charge of operations, announced. Smalley emphasized that the seeding would be done "only if precipitation is deficient, and even then, such seeding will be carefully controlled."

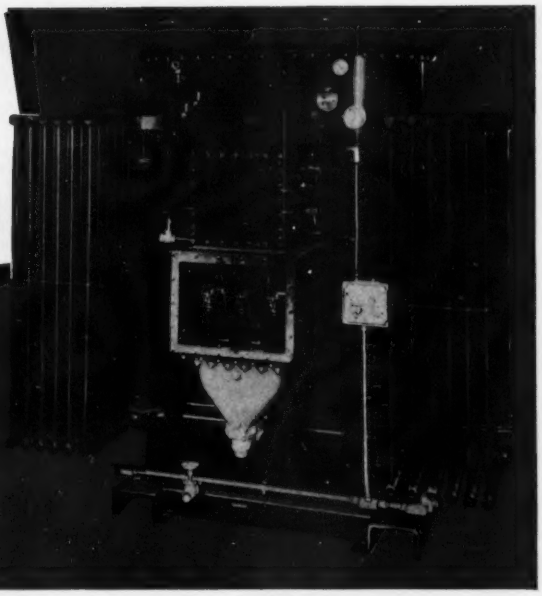
The two rivers, in the central Sierra between Yosemite and Lake Tahoe, were chosen because of all the high Sierra stream systems they are best suited for such seeding. Also, the two watersheds have adequate storage space—590,000 acre ft in 17 reservoirs. Even in wettest years, little of the winter snowpack is lost.

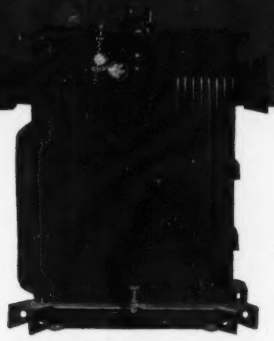
● **The Lincoln Water Development** Corp. in Washington's Lincoln, Grant and Adams Counties has announced abandonment of its 1952 cloud seeding program, and is refunding to participating farmers about 33% of the $36,000 they had invested in the project. Following one of the driest three months in the area's history, the rainmakers admitted that, while their silver iodide cloud seeding might have worked out, there just weren't enough clouds to work on. They may try again in 1953, but the rate will be less than the 10c per acre which prevailed during 1952.

● **Safety record** of 2,569,700 man-hours worked without disabling accident by B. C. Electric was recognized recently when Kenneth P. Hall, president of the B. C. Safety Council, presented certificates of merit to A. E. Grauer, B. C. Electric president, on behalf of 15 separate operations in the company. Lower mainland operations worked a total of 1,507,600 man-hours without accident, while Vancouver Island operations realized a total of 1,062,100 accident-free man-hours.

● **Washington Water Power** Co. will receive Ebasco's Gold Award for its 1952 safety record. The award is given annually to the client company showing the greatest reduction in accident frequency below the national average for the electric utility industry. WWP's injury index was 80.88% below the national average.

MOLONEY *Askarel* TRANSFORMERS





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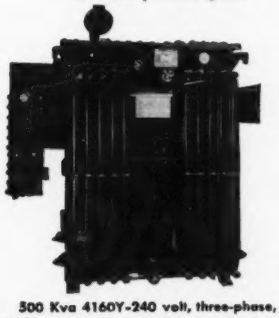

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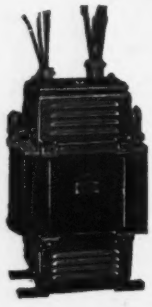

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NEWS ABOUT PEOPLE

● **D. R. McClung** has been made executive vice-president of Pacific Power & Light Co. and **E. Robert de Luccia** is now vice-president and chief engineer. McClung had been vice-president and assistant to the president, in charge of physical operations. Formerly chief of FPC's bureau of power, de Luccia joined PP&L in 1951 to supervise construction of the Yale project. His title had been vice-president in charge of the Lewis River development program.

● **Appointment of David D. Moffatt Jr.** as assistant to the president of Utah Power & Light Co. has been announced by **President George M. Gadsby.** He had been serving as assistant to **J. A. Hale,** vice-president. Moffatt attended the University of Utah and was graduated from the University of California. He holds a Master's degree from MIT, where he was a fellowship student. He joined Utah Power & Light in 1929 and served successively as salesman, lighting specialist, division sales manager and rate engineer. He served in World War II, attaining the rank of captain. On his return to the utility, he was research engineer and staff engineer before appointment as Hale's assistant.

● **Retirement** of **William H. Nalder,** chief designing engineer of the Bureau of Reclamation, was announced in Denver. Caused by ill health, the retirement ended a 43-year service with the bureau that began five months after his graduation from Washington State College. Since 1917 he has been with the bureau's engineering office in Denver, which serves the entire bureau.

● **H. C. Cranfill** has been appointed assistant to the vice-president, operations, of Columbia-Geneva Steel Division, U. S. Steel. He succeeds **R. B. Freeman,** who has been transferred to Pittsburg, Calif.

● **H. F. Detrick,** vice-president of A. O. Smith Corp., was given additional responsibilities and transferred to the company's Milwaukee headquarters. He will have charge of the capital goods manufacturing and marketing business. Until his transfer he was vice-president and general manager of the Pacific Coast division, which fabricates welded steel products, electric motors and allied products and markets all A. O. Smith lines in the Western states.

McClung

de Luccia

● **Neil K. Yarnell,** former assistant chief distribution engineer for Southern California Edison Co., has become associated with H. J. Randolph Co., engineering representatives in southern California and Arizona. A graduate of University of Illinois, since that time he has been with Edison Co. During the war he served with Columbia University division of war research in sonar.

● **Walter J. Walsh,** San Francisco attorney and former electrical engineer with Great Western Power and Montana Power, has become chairman of the Commonwealth Club's propaganda section.

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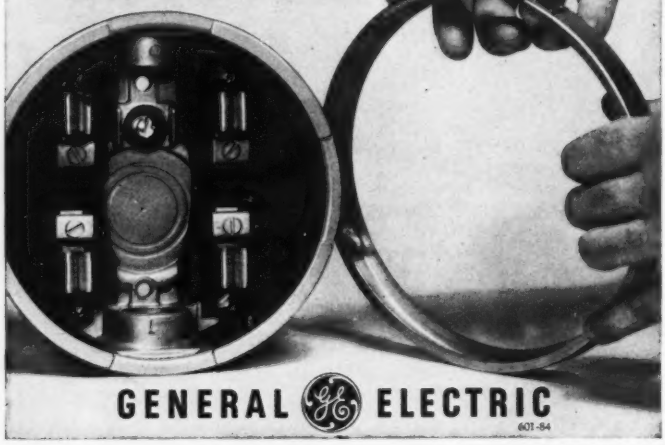

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● **Two professors of electrical engineering** at the University of Washington have retired after many years on the faculty. **Edgar A. Loew** became an instructor in 1909, after receiving his degree in electrical engineering from Wisconsin in 1906. He became a full professor in 1923, dean of the College of Engineering in 1935 and dean emeritus in 1948. **Gordon R. Shuck** became an instructor in 1918, after being graduated from Minnesota in 1906, and a full professor in 1937. Both have served as chairman of the Seattle section, AIEE. Loew has been a fellow of the AIEE since 1936. Shuck also was chairman of the Washington state chapter of the IES in 1947. Loew has written two books, **Electrical Power Transmission** and **Direct and Alternating Currents,** both published by McGraw-Hill.

● **Henry A. Carlberg** has been appointed manager of plant engineering, part of General Electric's manufacturing department at Hanford Works, Richland, Wash. He will be in charge of both mechanical and electrical engineering connected with operation and maintenance, maintenance of instruments used in manufacturing, and liaison with the organizations that design and construct new manufacturing facilities.

● **General Electric Supply** recently announced the following appointments in its Los Angeles district: **V. W. Moritz,** sales manager of radio and television; **P. L. Herbert,** apartment house and builder sales manager; **L. J. Perkins,** lamp specialist; and **L. C. Ruescher,** lighting specialist.

● **Promotion of Ernest Rochschild** to export manager of Kaiser Aluminum & Chemical Sales Inc. has been announced by **Bert Inch,** vice-president in charge of sales. Formerly assistant export manager, Rothschild succeeds **Ray G. Boyd,** now general product manager. His headquarters will be in the general sales offices of Kaiser Aluminum at Oakland, Calif.

● **Richard H. Gannon,** former assistant district manager for Kaiser Aluminum & Chemical Sales at Washington, D. C., has been promoted to manager of Kaiser Aluminum's Los Angeles district sales office.

● **Maxwell E. Nelson** has been appointed by **E. D. Sherwin,** president of San Diego Gas & Electric Co., as a new director of industrial relations for that company. He has been administrator of the public utility employers' institute for the last six years.

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● **J. G. Eernisse,** after 30 years of electrical and mechanical engineering service with the City of Tacoma, Wash., has retired to enter private engineering practice. An engineering graduate of the University of Washington, he started with City Light in 1922 as an electrical engineer, participating in construction of the division's first steam and hydroelectric plants.

● **Louis P. Growney** has joined Pacific Power & Light Co. as industrial development engineer. He was formerly industrial assistant for the Portland Chamber of Commerce in the industries department. A graduate of the University of Alabama, Growney also attended Notre Dame and North Carolina State College. He was a methods engineer with the Hyster Co. and worked with Goodyear Aircraft before joining the Chamber staff.

● **Dr. J. M. Pettit** of Stanford was awarded the Western Electronic Achievement Award at the Pacific Region Institute of Radio Engineers convention at Long Beach Aug. 29. It was the first award made by IRE in the Seventh Region. Dr. Pettit is an associate professor of electrical engineering at Stanford and also a member of AIEE.

● **Carl Moore,** manager of the Stevens County PUD at Colville, Wash., has resigned to enter business with his brother in Lewiston, Idaho. He was with the Stevens County Electric Cooperative before it merged with the PUD.

● **Eldon N. Dean,** vice-president in charge of sales for the F. B. Connelly Co., Northwest manufacturers' representative, has left that company to establish his own distributorship firm at Oklahoma City, Okla.

● **William H. White** has been appointed manager of field sales with Associated Wholesale Electric Co. by **Dave Chilver,** general sales manager. White has been with Associated Wholesale for 25 years.

● **Among** electrical engineers recently completing the Allis-Chalmers graduate training course is **Nicholas Kreekon,** who is a graduate of the University of Washington. He has been assigned to the switchgear section.

● **William E. Darden** has been made California representative for Hammarlund Mfg. Co. of New York. He was transferred from company headquarters to take charge of offices at 1406 S. Grand Ave., Los Angeles, and 290 First St., San Francisco.

Deaths

● **G. Max Thomas,** 65, senior valuation engineer for Pacific Gas and Electric Co., in the general office at San Francisco, died in an Oakland hospital Oct. 16. He was born in Texas in 1887 and was graduated from the state university as an electrical engineer in 1910. In 1911 he received a Master of Science degree in the College of Mechanics at University of California and joined PG and E the following year. He was a first lieutenant in the Army in World War I and afterward spent four years with firms in China. Returning to PG and E in 1924, he became assistant valuation engineer in 1925, head of the valuation department in 1941 and senior valuation engineer last January.

● **Stanley Albert Kerr,** 64, long-time engineer for the Bureau of Reclamation, died in Inglewood, Calif., Sept. 17. Kerr retired as Sacramento regional planning engineer for the bureau on April 1, 1950. At that time he was awarded the Interior Department's distinguished service medal. He started work for the bureau in 1907 and served for a total of 25 years in Montana, Idaho and Nevada. In 1925 he left to work for the J. B. Lippincott engineering firm in Los Angeles. He remained with Lippincott until 1939 when he returned to the bureau's Denver office. In 1941 he was transferred to Sacramento and supervised work on the Central Valley Project Basin Report.

● **Edward W. Florence,** 72, former manager of Pacific Gas and Electric Co.'s Sacramento division for 25 years and a company employee for 41 years, died in Sacramento Sept. 29. He had joined the utility in Chico in 1905 and was Sacramento manager from 1920 until his retirement in 1946.

● **John Duck,** founder of the electrical fixtures firm of John Duck & Son, died at Vancouver, B. C., recently at the age of 77. Mr. Duck was born in Ontario and went to Vancouver in 1912. He started his own business shortly after his arrival. In 1937 he retired from active service.

● **Merlin H. Aylesworth,** who some 25 years ago was managing director of the National Electric Light Assn. and often visited the West and who later became first president of NBC, died in New York City in October.

Facts from NEW HAMPSHIRE

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"Until three years ago, we were having considerable transformer trouble due to lightning. 'CSP' Transformers proved to be our solution," reports a New Hampshire Utility.

"One particularly troublesome 2,400-volt conventional transformer required re-fusing about twice a week during the lightning season. One time the lightning arresters were actually blown up. We installed a 'CSP' Transformer and no outages have been experienced since."

Installation and maintenance costs for "CSP" (Completely Self-Protecting) Transformers are always lower, because complete protective equipment is built in, not separately mounted. A two-year survey of Electric Light and Power Companies shows the following:

NATIONAL AVERAGES

	"CSP"	Conventional
Installation Costs	$13.87	$24.74
Burn-out Rate	0.257%	1.005%
Fuse Outages	None	5.64% (at $6.52 per outage)
Load Checks	Automatic	12.8%
Breaker Reset	1.02%	None

If you'd like to check your own costs against these national averages, ask your Westinghouse representative for Booklet B-4247-B, "Transformer Costs and Their Relation to Profits". Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-70594-A

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"CSP" DISTRIBUTION TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

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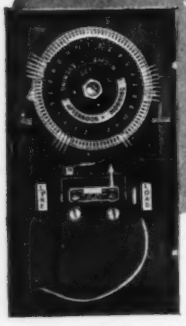

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NOTES ON THE TRADE

● **Kaiser Aluminum & Chemical** Corp. has formed an electrical research department at its Trentwood plant near Spokane, Wash., to develop new and improved uses of aluminum as an electrical conductor. Head of the department is Dr. E. W. Greenfield, who has been associated with the company's metallurgical research department at Trentwood. Present staff members are Dr. L. F. Roehmann, senior research electrical engineer; Alan Selker, Jack Trebby, L. Boleraczky, Charles Lang and Mrs. Zita Hotchkiss. The program will include development work on new and improved types of aluminum bare and insulated conductors. Special equipment will be set up to investigate the performance of television leads, power cable connectors, and other cables and cable components. Tests will be under controlled, simulated service conditions such as cyclic loading, salt-fog sprays and vibration.

● **McCabe-Powers Auto Body** Co. of St. Louis has completed distributor arrangements on the West Coast and has appointed the following to handle Powers-American public utility bodies and equipment: Pacific Body Builders Inc., 1812 N.E. Grand, Portland; Utility Body Co., 1530 Wood St., Oakland, Calif.; Utility Trailer & Equipment Co., 3400 Sixth Ave. S., Seattle; Win Ward Co., 962 Price St., Pomona, Calif. The company branch office at 428 Latham Square Bldg., Oakland, Calif., is supervised by **Andrew J. Macho.**

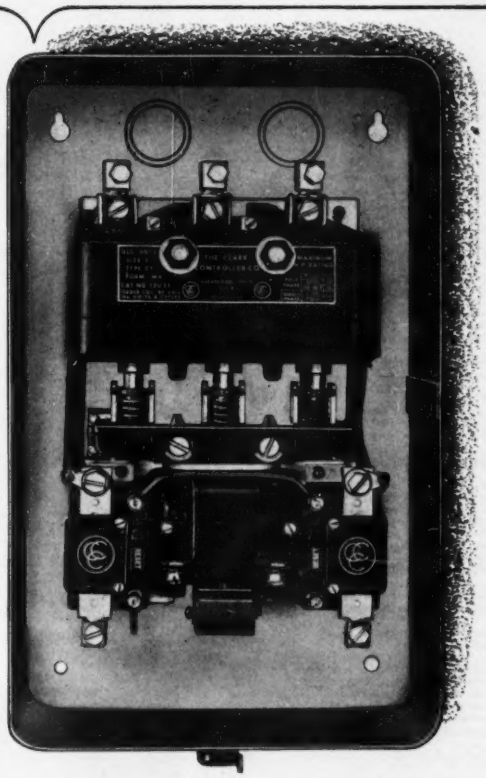
● **Paul L. Mullenbach** Co. will be known henceforth as BullDog Electric Products of Los Angeles. Effective Oct. 1, the change was made to better identify the company as local representative for BullDog products and involves no change in ownership, management or policy, according to **Paul L. Mullenbach.** The Los Angeles address is 3008 E. Olympic Blvd.

● **Shaffer & Nelson** has been appointed Northwest representative for Burndy Engineering Co. and will cover Washington, Oregon, northern Idaho and western Montana. The firm has offices in Seattle at 312 Occidental Ave. and in Portland at 1204 N.W. Glisan St. Eric H. Nelson heads the former, John C. Shaffer, the latter.

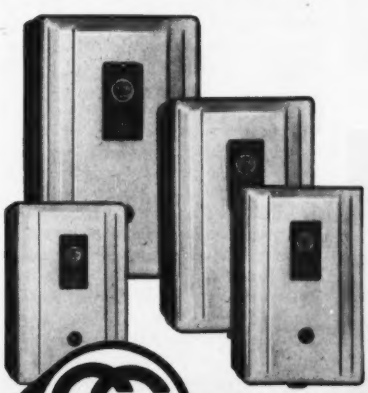
CLARK TYPE "CY" AC MAGNETIC MOTOR STARTERS

Now Available in SIZE 3

Now you can get this revolutionary starter in sizes 0, 1, 2, *and 3*. The size 3 uses the same new principle of arc interruption—with magnetic blow-outs and twin-break contacts—which has proven so successful on size 2 . . . Here is a rugged AC Magnetic Starter that provides the extra protection and dependable operation of Mill-type, heavy-duty construction in a compact unit. In addition to the many built-in features which mean better performance, this starter is designed to reduce maintenance costs to an absolute minimum. Contact surfaces can be quickly inspected without tools. Contacts can be quickly replaced with a screw-driver and a wrench without removing starter from cabinet. All parts are accessible and removable from the front. Captive screws are used wherever possible to simplify reassembly.



Clark Bulletin 6013 type "CY" AC Magnetic Starter, Size 3 with NEMA 1 cabinet cover removed. Note clean design, with plenty of wiring space.



CLARK Type "CY" AC Magnetic Starters are available in a wide variety of sizes, types of cabinets, and combinations of devices. Write for information.

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PROFILES

Lovell Winter Saunders

Fuller Black

Commending a century of "constructive service to San Francisco and its people," the San Francisco Chamber of Commerce awarded a Certificate of Honor to Pacific Gas and Electric Co. PG and E President James B. Black received the award from W. P. Fuller III, Chamber president. Black also was honored last month by northern California's construction industry, which gave him its annual Achievement Award as "Man of the Year." This award recognized company's $1 billion construction program

W. L. Winter of Westinghouse presented a gold-plated meter for recent ceremonies celebrating Tucson Gas, Electric Light & Power Co.'s 50,000th meter installation. Power company vice-presidents, N. M. Lovell and J. H. Saunders, accepted the gift

Cabot

Matthew A. Cabot has been appointed Western sales manager for Day-Brite Lighting Inc., with headquarters in San Francisco. Since 1951 he had been with the H. B. Squires Co., San Francisco representative for Day-Brite. His career also includes service with private architectural and engineering firms, University of Kentucky, American Elevator & Machine Co. and DuPont. He was a Navy officer during the war

Hawley

G. N. Hawley has been elected a vice-president of Southern California Edison Co. He took over direction of the company's commercial organization and activities upon retirement of R. C. McFadden on Nov. 1. Hawley joined Edison in 1928 as an industrial specialist, was made assistant new business manager in 1935, industrial sales manager in 1938, sales manager in 1949; had been assistant to president since 1950

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Utilities everywhere award the Series 350 an "Oscar" for efficiency. This versatile unit enables a two-man crew to perform maintenance and installation work normally requiring additional men and vehicles. The compact, fold-over derrick sets 40′ poles—a job which would otherwise require costly heavy-duty equipment. There's a 24′ ladder which can be quickly erected for overhead work. Compartments are equipped to carry tools and materials for many service operations. The under-floor winch is always ready to use—without moving material load. No wonder the Series 350 has been acclaimed "the most versatile performer in the field."

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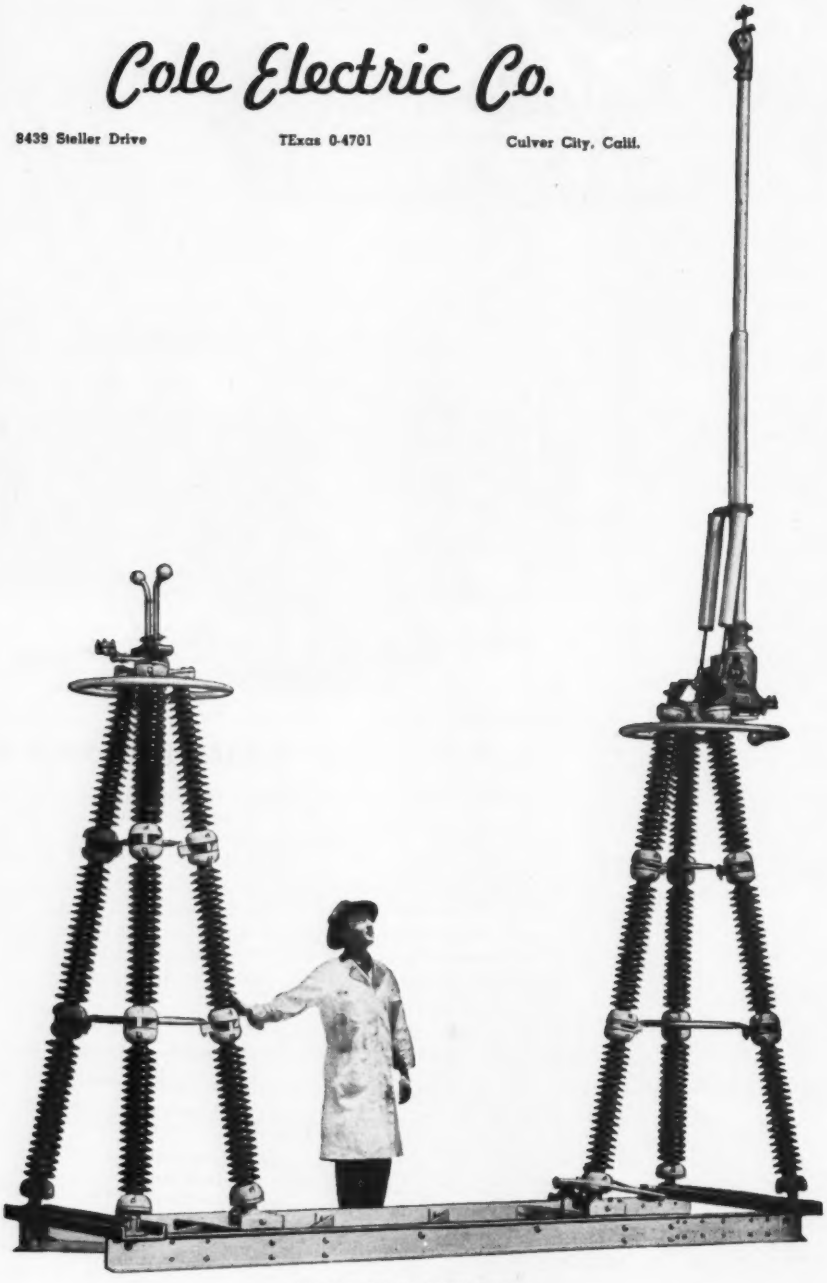

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Vertical Break—Three Pole, Single Throw
SILVER TO SILVER CONTACTS
Group Operated
(One pole shown)

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Today hundreds of modern P. G. and E. trucks use two-way radio, latest tools to safeguard your service.

Your P. G. and E. service crews, with a bigger job every year, have steadily increased their efficiency and capacity to serve you. Yet, the prices you pay for gas and electricity today are far below what they used to be. Today in a typical city you pay only $8 for 100 kilowatt-hours of electricity and 100 therms of gas that would have cost $60 when P. G. and E. service was young. One of the best results of 100 years experience is that gas and electricity are truly cheap throughout Northern and Central California!

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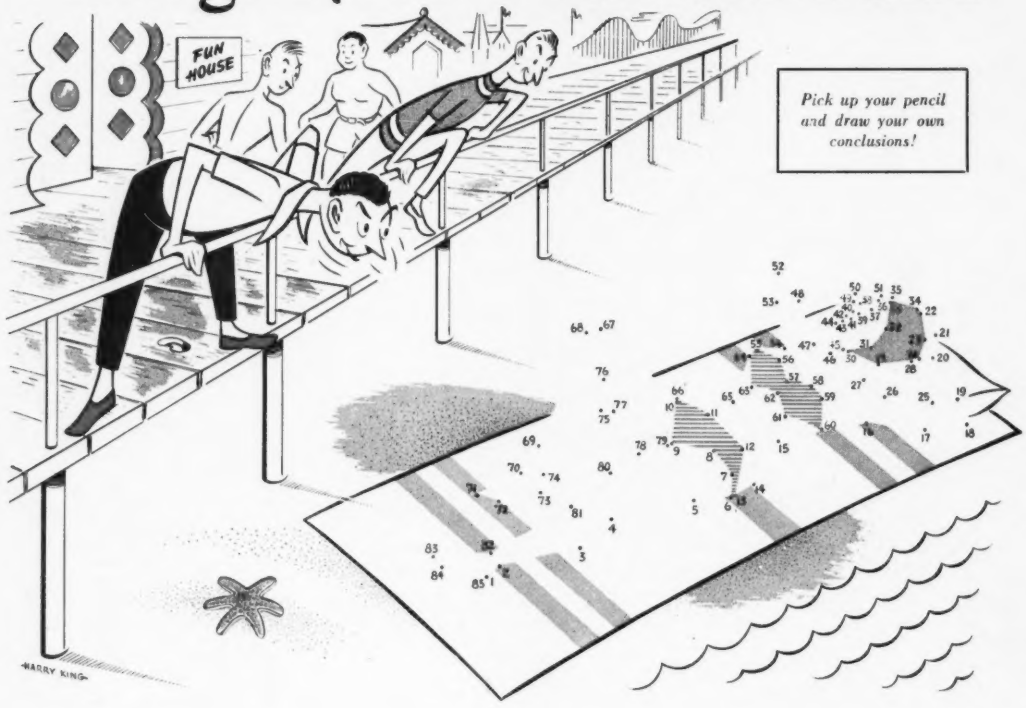

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